

BLUE BOOK

SERVING THE METAL WORKING INDUSTRY SINCE 1906

SPECIAL FEATURES THIS MONTH

**Special Report on Knee, Hand,
Bench type Milling Machines**

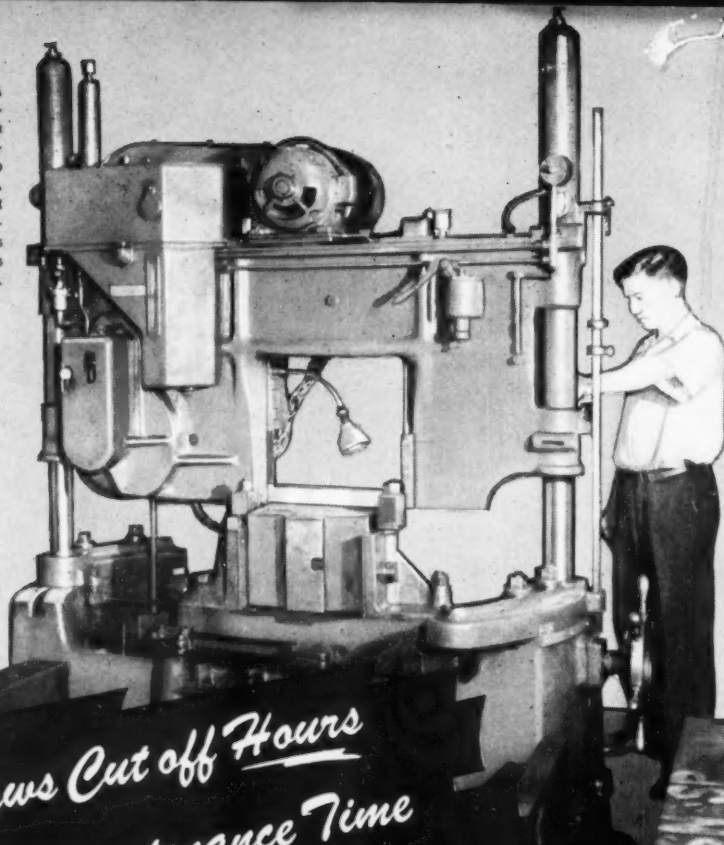
**Recent Developments in
Metallizing**

**Should You Buy a Special
Machine**

**Other items of interest listed
on page 5.**

A HITCHCOCK PUBLICATION

Below (left) is a model 9A MARVEL High Speed Production Saw with automatic bar push-up, which automatically cuts off billets to exact size (ends fin waste), and, a No. 18 MARVEL Giant Hydraulic Hack Saw for cutting off large bars and billets and trimming dies in sizes up to 18" x 18" cross section.

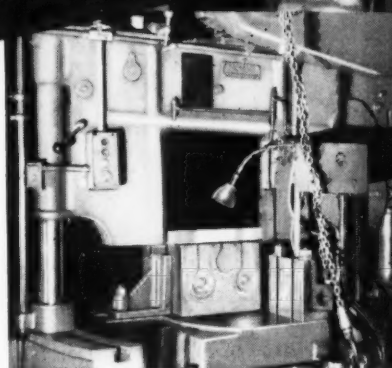


*Marvel Saws Cut off Hours
from Die Maintenance Time*

Hubbard & Company, Pittsburgh, manufacturers of pole line hardware, picks, hammers and other drop forged specialties, use MARVEL Saws to eliminate tedious hours in making and maintaining their giant forging dies. Not only do these saws do all regular cutting-off of steel for the machine shop, die blocks for die shop and exact size billets for the forge shop, they also materially cut the cost of die maintenance.

Previously, it was necessary to plane the face of dies being re-worked. This was a long and tedious job because the die face is always work-hardened with hard spots that had to be chipped or ground out before the planer tool could make a cut. Now with MARVEL Saws, the face of a die is speedily and accurately "skinned"—a thin slice is sawed off just behind the hard spots. After this speedy "skinning" and a single facing cut on the planer, the die is ready for the die sinker. This modern MARVEL method is saving Hubbard a lot of dies, materials, labor and machine time.

For quick reference see our section in Sweet's File—Mechanical Industries or write for catalogue.



ARMSTRONG-BLUM MFG. CO.

"The Hack Saw People"

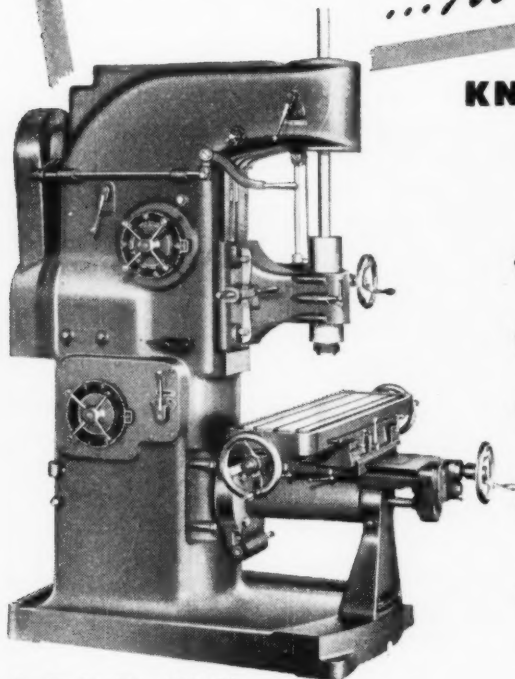
5700 Bloomingdale Ave.

Chicago 30, U.S.A.

Faster... Better...

PRECISION BORING and VERTICAL MILLING

... At Lower Cost!



**KNIGHT'S
NO.**

40

- ✓ Knight's tilting swivel table eliminates all special jigs and fixtures, even on most complicated jobs.
- ✓ Extreme flexibility and exceptional capacity make work transfers to 2 or more machines unnecessary.
- ✓ 16 Table and spindle feed changes, plus 4 vertical spindle feeds assure greater efficiency from both large and small tools and cutters.
- ✓ Full-vision direction, speed and feed controls—direct-reading speed and feed change dials—fast cutter changes at spindle nose.
- ✓ Rugged 1-piece column construction—precision gearing—wide bearing surfaces insure positive accuracy, long service.

Smaller No. 30 and No. 20
machines also shown in catalog.

Mail Coupon NOW!

W.B. KNIGHT
MACHINERY COMPANY



3920 WEST PINE BLVD.
ST. LOUIS 8, MISSOURI

ATTACH TO COMPANY LETTERHEAD

W. B. KNIGHT MACHINERY CO., 3920 West Pine, St. Louis 8, Mo.
Send catalog on Knight No. 40 and other milling machines.

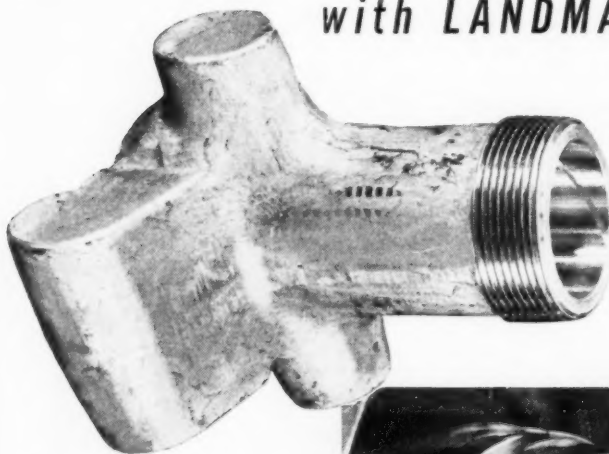
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Title _____

MORE GOODS for MORE PEOPLE at LOWER COST

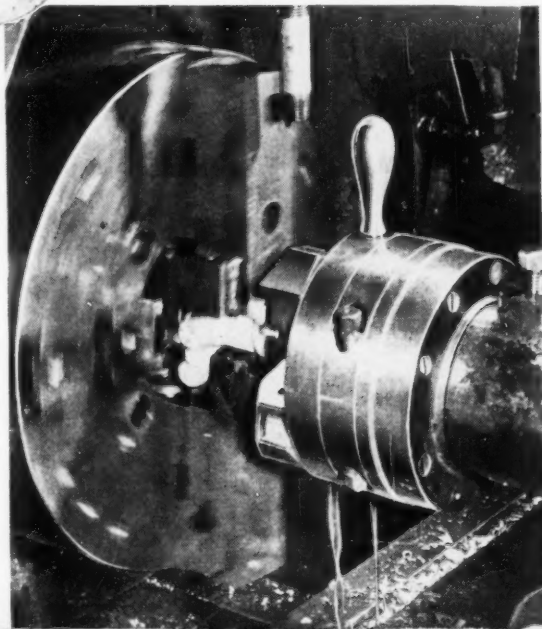
GOOD LEAD ON THREADS

with LANDMATIC HEADS



The permanent throat feature of the chasers maintains initial cutting accuracy throughout the entire life of the tool. When the chaser is reground, no grinding is done on the throat. Thus the throat angle and nut action is never altered and enables the chaser to consistently produce threads accurate for lead. For further information, on Landis Die Heads & Tangential chasers, write for Bulletins F-80, F-90 & A-50.

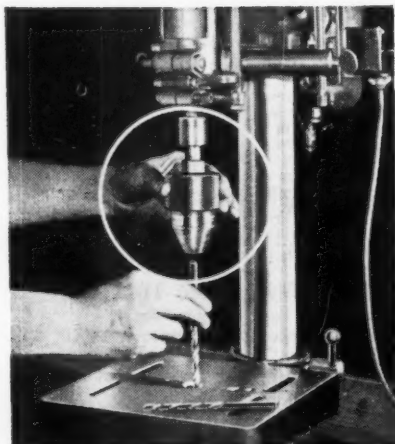
These photographs were taken in the Machine Manufacturing Division of the Crown Cork & Seal Company, Inc., Baltimore, Maryland.



The permanent nut action of Landis Tangential chasers assures accurate pitch threads throughout these crown port closing bodies used in bottling machinery. Landmatic Heads using Landis Tangential chasers cut $1\frac{5}{8}$ " 16 pitch USS threads $\frac{1}{2}$ " long on naval bronze forgings at the rate of 50 SFM. Actual threading time is about 5 seconds.

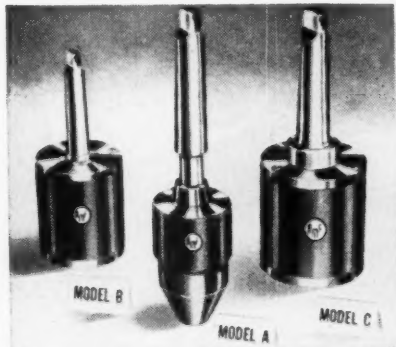
LANDIS *Machine CO.* WAYNESBORO
PENNA., U.S.A.

Change drills in a second, safely with this Automatic Chuck while spindle is running



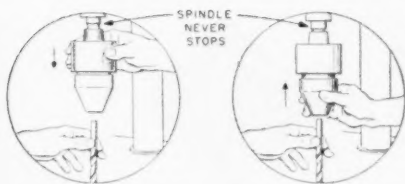
AMF Wahlstrom Chucks are rugged tools, proven out in many years of heavy production work. Simple construction assures ease of operation.

THESE WAHLSTROM TOOLS CUT COSTS, TOO



Wahlstrom Chucks are available in several size ranges: Model A—1/32" to 1/2"; Model AA—1/64" to 3/8"; Model B—15/64" to 1/2"; 3/8" to 3/4"; 17/32" to 1"; Model C—Holds any size tool with No. 1, 2, or 3 M. T. Shank.

HERE'S ALL THERE IS TO CHANGING DRILLS



1. Grip sleeve—pull down
—jaws open automatically
—drill is released.

2. Insert new drill—push
up tapered part—drill is
locked in place.

You don't stop the machine to change drills with the AMF WAHLSTROM CHUCK. No keys, collets or wrenches are needed.

That's why Wahlstrom Chucks cut costly minutes in changing tools for drill press work or for spotting, drilling and reaming in boring or milling machines. They'll also save money in lathe work for burring, turning, filing, etc. *One spindle does the work of several.*

Tools last longer, too... smooth, hardened and ground jaws grip tight without chewing into tools. Grip increases with the load.

For fast, uninterrupted production, use the quick-change AMF WAHLSTROM CHUCK. It is the only fully automatic drill chuck which holds the widest range of straight shank tools...Model A—1/32" to 1/2"; Model AA—1/64" to 3/8".

**See your local distributor or write today
for Bulletin 56-4**

WAHLSTROM TOOL DIVISION, AMERICAN MACHINE & FOUNDRY CO.
5502 SECOND AVENUE BROOKLYN 20, N. Y.

WAHLSTROM
fully automatic
DRILL CHUCKS

NO KEYS, COLLETS OR WRENCHES



ARMSTRONG

TOOL HOLDERS . . .

for the toughest steels!



WRITE FOR CATALOG

The "Armstrong System" provides special ARMSTRONG TOOL HOLDERS for ARMALLOY (cast alloy) and for ARMIDE (carbide-tipped) cutters. With these modern cutting tools, the toughest and hardest steels are easily machined. For heavier feeds and the extremely high cutting speeds become practical (300 f.p.m. with ARMALLOY cutters; 600 f.p.m. with ARMIDE cutters). Delays for tool re-grinding are reduced to an absolute minimum — edges hold up to 100 times as long.

These new tool holders and cutters are stocked by your local ARMSTRONG industrial distributors.

ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"

5208 West Armstrong Ave., Chicago 30, U. S. A.



Blue Book Contents

published monthly • vol. 46 no. 9

september, 1950

Special Report on Knee, Bench, Hand-type Milling Machines

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acceptance under section 34-64, P. L. and R. authorized
office • DeKalb, Illinois

Hitchcock District Managers are listed on page 226.

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WHEATON, ILLINOIS

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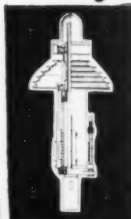
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Rigid Accuracy



Cross-section of spindle assembly of "Buffalo" No. 13 Drill shown. All parts are high grade steel—the spindle itself a special heat-treated alloy steel, mounted on precision-type ball bearings. Ample takeup provision assures long, accurate life with no end-play.



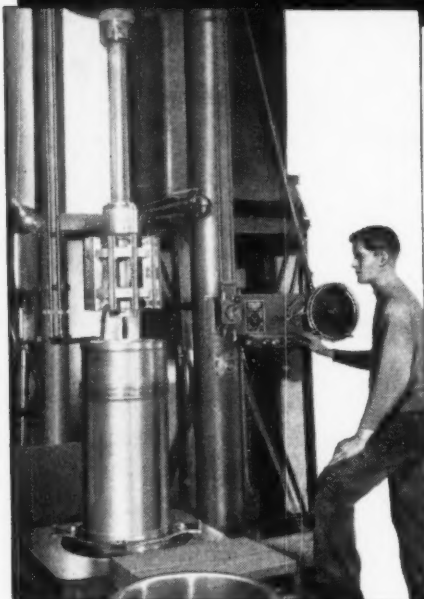
Today's high standards of accuracy in drilling require rigid, precision-built drills. "Buffalo" builds this rigidity into all its drills—heavy, stable bases—large diameter steel columns—smooth, true-running spindles that permit no deflection. If you want rigid accuracy that reduces re-working and waste, specify "Buffalo" for your drilling.

"Buffalo"

BUFFALO FORGE COMPANY
161 Mortimer St. Buffalo, New York

Canadian Blower & Forge Co., Ltd.
Kitchener, Ont.

YOU CAN'T BEAT FULMER HONING



Fulmer Model 15-48 honing 12½" x 42" Diesel liner. .012"-.015" of Gun Iron is removed in 10-12 min. Machine capacity: 2"-15" diam.

FULMER COMPANY NOW EXCLUSIVE U. S. DISTRIBUTOR FOR ALEXANDER BALL HONING TOOLS

Available in sizes from ½" to 50" diam.

● WRITE FOR NEW 12 PAGE HONING BULLETIN.

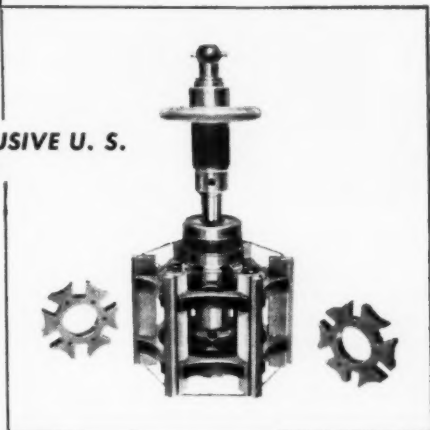
Fully illustrated. Gives valuable data on honing applications, Alexander Ball Honing Tools, and specifications on all models of Fulmer Honing Machines.

● **THE FASTEST**, most efficient and easiest method of finishing cylindrical bores ½" to 30" diam.

● **FAST STOCK REMOVAL**: It is the common practice for stocks of .015"-.060" to be removed in a fraction of the time required to set up the job for boring.

● **EXTREME ACCURACY**: Hold to ±.0001" tolerance on bore size, straightness, roundness, with any surface finish desired.

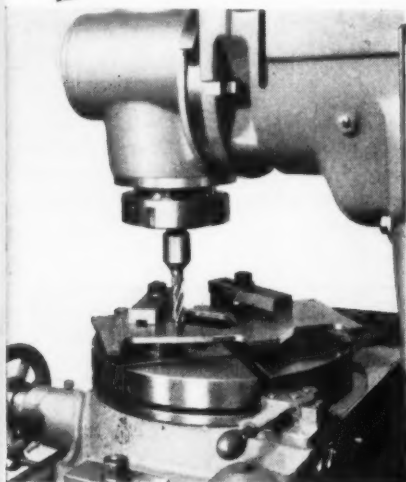
● **ENGINEERED** to give maximum production with minimum investment, Fulmer Honing Machines offer the greatest value in the honing field. Get full details today.



C. ALLEN FULMER CO., 1242 First National Bank Bldg., Cincinnati 2, Ohio

(EXCERPT FROM A LETTER RECEIVED FROM A TOOLMAKER)

FOR MY MONEY A CINCINNATI
IS TOPS, BUT I WISH OUR SHOP
EXTRA EQUIPMENT

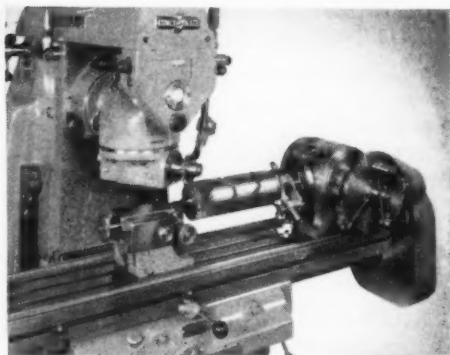


↑ Heavy Duty Vertical Milling Attachment, with a Quick Change Adapter on its spindle nose, mills a radius in an irregularly shaped part clamped to a Circular Milling Attachment.

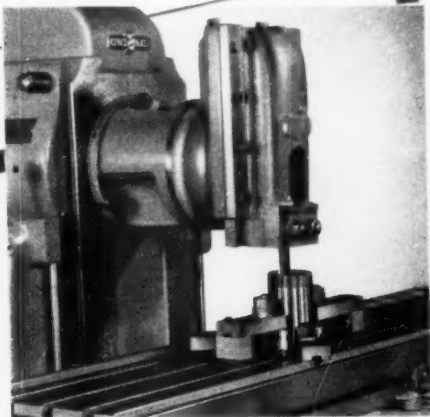
Universal Spiral Milling Attachment and Dividing Head set up to mill helical teeth on the end of a drum cam. These attachments have an exceptionally wide range of uses.



• Cincinnati Milling builds the type of attachments that toolmakers need to turn out their work quickly and safely. A few CINCINNATI attachments are shown here. Individual catalog type literature is available for each. All of them are pictured in attachment circular M-1382-2. May we send a copy to you?

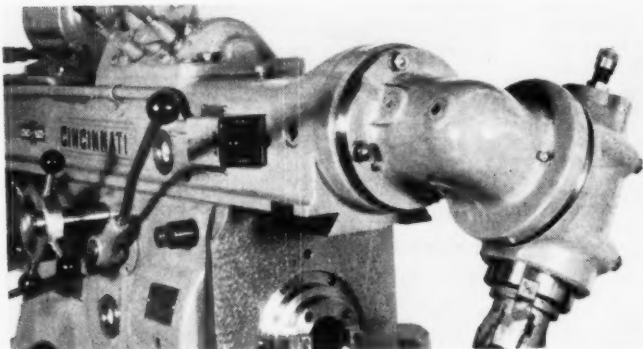
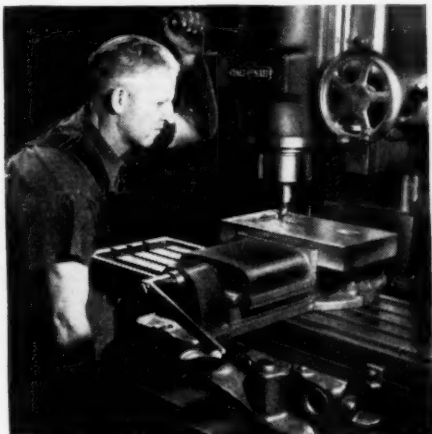


MILL
HARD MORE



Slotting Attachment has an adjustable stroke of 0 to 4"; may be swiveled 360°.

Milling a fixture part held in a No. 5 Plain Vise. Vise jaws may readily be changed to special designs suitable for the work. Swivel, Toolmaker and All-Steel Vises also available.



Motor Driven Universal Milling Overarm Attachment on a CINCINNATI Dial Type. Always ready to use; convenient for frequent changes in setups.



THE CINCINNATI MILLING MACHINE CO.

CINCINNATI 9, OHIO, U. S. A

MILLING MACHINES • BROACHING MACHINES • CUTTER SHARPENING MACHINES
FLAME HARDENING MACHINES • OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID

In Distinguished Company



OIL-RELIEF BY-PASS VALVES

Installed by Cincinnati Planer Company to lubricate table ways on planers and planer type milling machines.

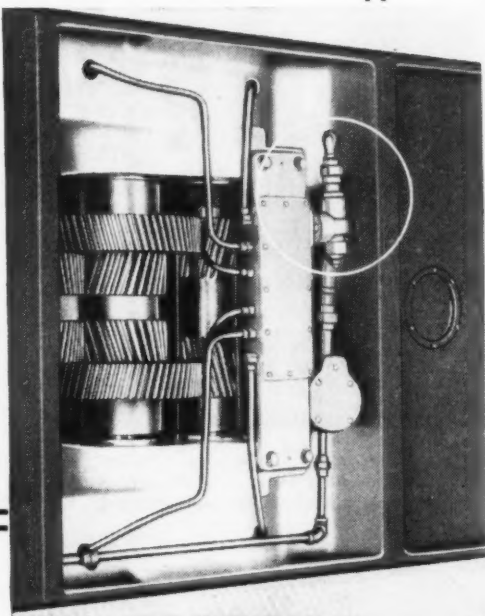
This distinguished company, always proud of its products, uses FULFLO OIL-RELIEF VALVES to assure constant, uniform lubricating pressures.

—◆—
Write on your letterhead
for free copy:
FULFLO MECHANICAL
DATA BOOK

THE



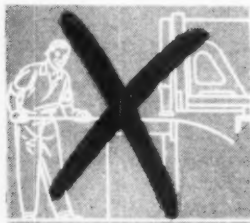
Specialties Co., Inc.
BLANCHESTER, OHIO



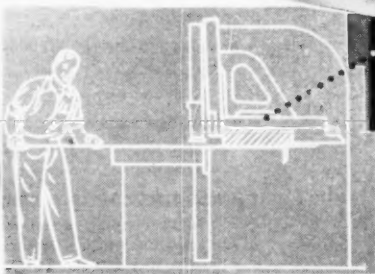
CHATTERLESS . . .

installed quickly with no further maintenance. Pipe sizes: $\frac{1}{4}$ " to 2" standard pipe thread and STD 300# American Flange Valves 1" to 2 $\frac{1}{2}$ ".

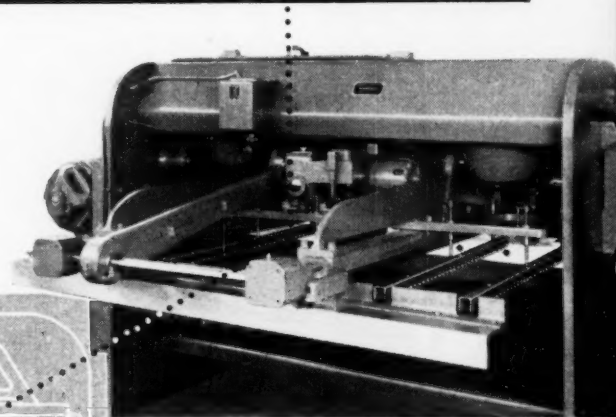
Another Cincinnati Feature ... the No-Sag Magnetic Sheet Support



Troublesome
Sag



Quick gauging—easy handling



Thin steel sheets that sag, and normally are difficult to back gauge, are handled easily and accurately with the Cincinnati Magnetic Sheet Support. Costs are reduced, production increased, and quality of product improved. Maximum capacity: 16 gauge. Range: 36" to 48"; for magnetic sheets only. Available as extra equipment on new Cincinnati Shears.

WRITE
for detailed
information

Other features pioneered by Cincinnati FOR SPEEDY AND ACCURATE, PROFITABLE SHEARING

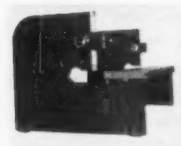
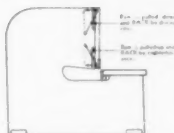


HYDRAULIC HOLDDOWNS

Tons of pressure hold the work securely—a necessity for accurate cutting.

NON-FLOAT INCLINED RAM

Produces the most accurate shearing in the field and gives six major advantages — including shearing different thicknesses without changing knife clearance.



ALL-STEEL, NON- BREAKABLE FRAME

Developed and pioneered by The Cincinnati Shaper Company for long life and accurate performance.

PRECISION BACK GAUGE

Accurate to .002"—easy to use. Power front or standard hand control.



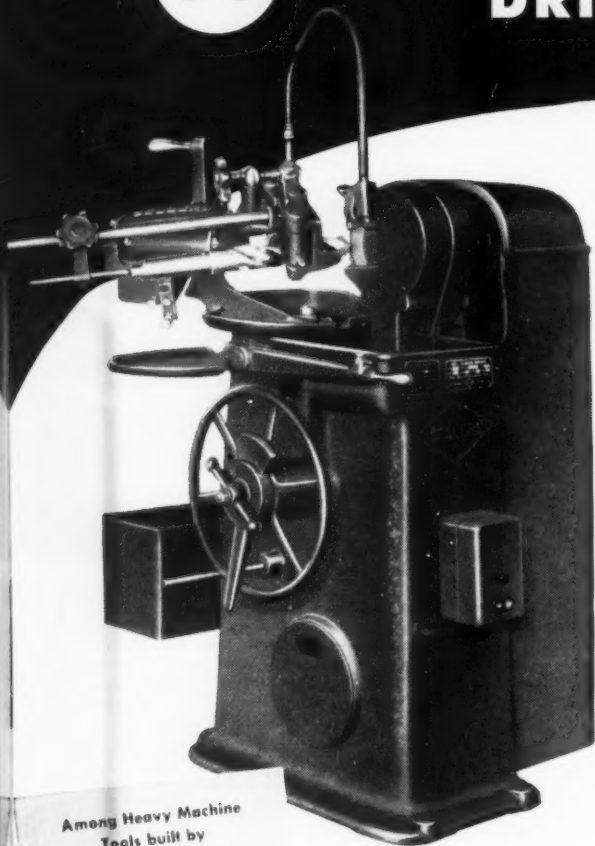
THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO U.S.A.
SHAPERS · SHEARS · BRAKES



**MODEL
6-G**

SELLERS DRILL GRINDER



QUICKLY PAYS FOR ITSELF IN DRILL MAINTENANCE SAVINGS

● INCREASED PRODUCTION

Free cutting accurate drills permit drilling machines to be operated at their most efficient speeds.

● LONGER DRILL LIFE

Less drill material is ground off when re-sharpening drills.

● MORE HOLES PER GRIND

Correctly ground—drills remain sharp for a greater number of holes.

● REDUCED ASSEMBLY COSTS

Eliminates under- and over-size holes. Saves reaming and boring.

● RECLAIMS DAMAGED DRILLS

Sellers grinding method reclaims many burned and broken drills that are ordinarily scrapped.

● ECONOMICAL

This Sellers Grinder has been known to have earned its original cost as many as six times over within a single year.

Among Heavy Machine
Tools built by
Consolidated are . . .

LATHES
BORING MILLS
DRILL PRESSES
MILLING MACHINES
BORING MACHINES
COLD SAW MACHINES
BORING, DRILLING AND
MILLING MACHINES
DRILL AND TOOL
GRINDERS
PLANERS
SLOTTERS
RAILROAD SHOP TOOLS
AUTOMOTIVE TOOLS
AND OTHER
SPECIAL MACHINES

The Sellers 6-G Drill Grinder provides an improved method of grinding that produces correctly formed drill points and duplicate lips. It automatically determines proper clearance according to drill size and grinds drills to equal length for use with multiple spindle drilling machines. This method materially reduces drill maintenance costs. A wet grinder that is especially adapted to grinding high speed twist drills from 1/4" to 3" diameter.

Send for complete information

BUILDERS OF HEAVY DUTY MACHINE TOOLS SINCE 1848

BETTS • BETTS-BRIDGEFORD • COLBURN • HILLES & JONES • MODERN • NEWTON • SELLERS



CONSOLIDATED

MACHINE TOOL CORPORATION

ROCHESTER 10, NEW YORK



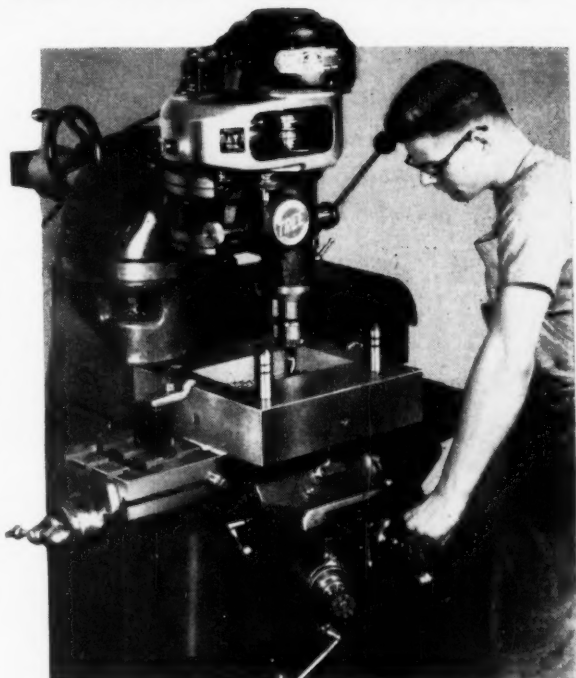
"A REAL TIME SAVER FOR OUR TOOL SHOP"

We have been using the TREE Milling Head Attachment in our tool and mold shop since 1947 and have found it to be a very rigid head for all milling operations. Its greatest value to us has been the time saved in cutter changes.

Of almost equal importance to us is the secure locking of the cutter itself in the collet. We now have four of the Tree heads in daily operation and have never experienced loosening or traveling of cutters in work.

signed,

D. P. Richards, Pres.,
RICHARDS TOOL & MOLD CO.



TREE MILLING HEAD ATTACHMENT

The versatile Tree Milling Head Attachment will speed up tool room operations in your shop. It's a precision unit that does milling, drilling or boring operations . . . AT ANY ANGLE. Greater capacity enables use of tools with shanks up to 3/4". Equipped with power feed . . . automatic collet closer. Compact design . . . 4" quill travel . . . Eight speeds—140 to 3500 RPM or 210 to 5200 RPM. Hardened and ground spindle and quill . . . Enclosed micrometer depth stop. Write for complete specifications today.

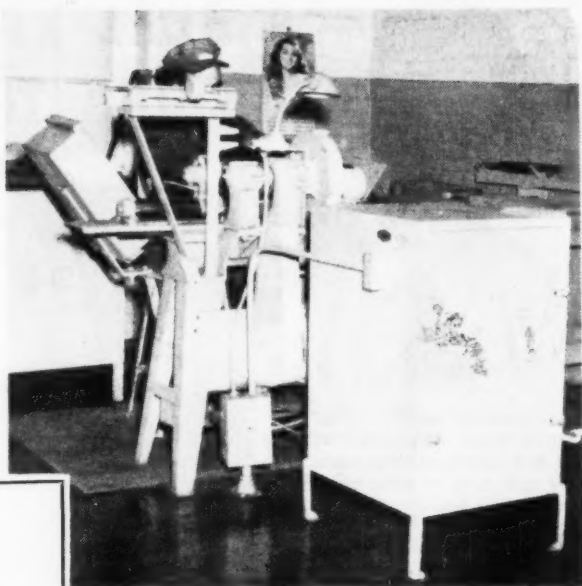
Export Office: States Trading Co., 401 Broadway, New York 15, N. Y. Cable: "STRADESO N. Y."

TREE TOOL AND DIE WORKS
1600 JUNCTION AVENUE RACINE, WISCONSIN

TORIT

DUST COLLECTORS

Self-contained units for carrying away dust laden air around grinding, cutting and polishing machines.



TORIT DUST COLLECTORS

get close to get all the dust from this buffing machine

How compactly a Torit Dust Collector will fit into your production layout is well illustrated above. Here only a foot of flexible hose is needed to connect the buffing wheel hood to the inlet of a Model 64 Torit Dust Collector, which, in turn, occupies a floor space less than 2 feet square.

Self-contained Torit Dust Collectors trap dust at its source and recirculate the cleaned air. They are easy to install, and may be moved as desired. Operating and maintenance costs are exceptionally low.

Torit Dust Collectors are built in sizes up to 5 H.P. For details and the latest Torit catalog, write:

TORIT MANUFACTURING CO.

303 Walnut St.

St. Paul 2, Minn.

MACHINE and TOOL BLUE BOOK



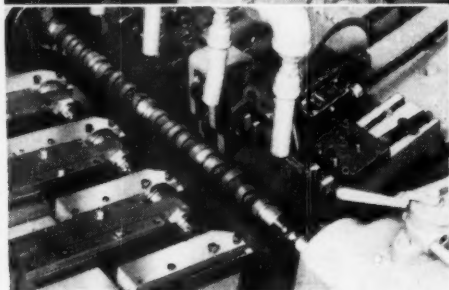
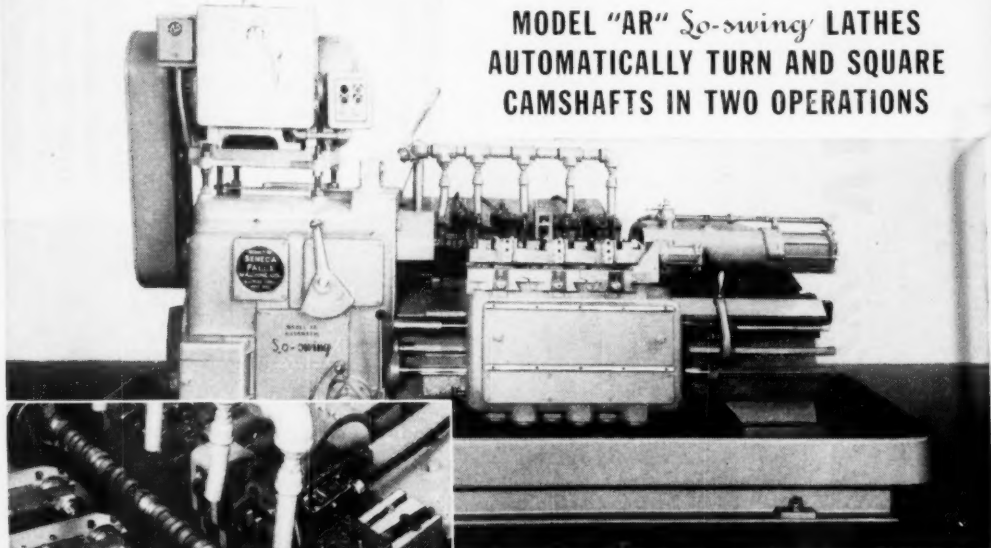
TORIT Dust Separators

Torit also manufactures a line of cyclone type dust separators. There are types for both outdoor and indoor exhaust. Sizes range from $\frac{1}{2}$ H.P. to 5 H.P., with the largest having a capacity of 2,100 c.f.m.

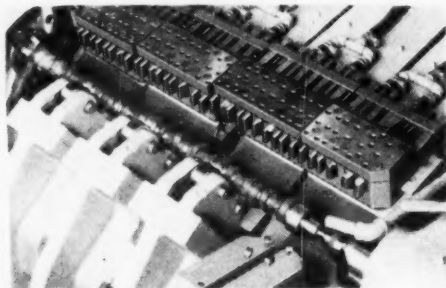
MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE Lo-swing PEOPLE" SENECA FALLS, NEW YORK

MODEL "AR" Lo-swing LATHES AUTOMATICALLY TURN AND SQUARE CAMSHAFTS IN TWO OPERATIONS



Close-up view showing first operation tooling.



Close-up view showing second operation tooling.

Problem: To turn and square automatically forged steel camshafts in two operations.

Solution: Two Model "AR" Lo-swing Automatic Lathes were selected for this job. In the first operation, the camshafts are delivered to the machine centered on both ends and with the pump gear diameter ground to size, thus providing a finished spotting for a two-roll steady rest, which is automatically advanced to support the shaft when the machine cycle is started. Four tools on the front carriage finish turn the line bearings, after which three steady rests automatically move into contact with the work and support it while the rear tools face and chamfer the line bearings. The entire operation is automatic and electrically controlled safety devices automatically withdraw the slides if for any reason the bearings are not turned to size.

In the second operation, the piece is reversed and driven from the opposite end with a 3-jaw, air-operated chuck. Three fixed Steady Rests support the work on the previously-turned line bearings. Two tools on the front carriage turn the unmachined end while thirty-four tools mounted on four Rear Slides square all cam lobes and the one end bearing. Rear Slide movements are staggered so that cutting pressure is limited to the tools of only one slide at a time.

Let Seneca Falls assist on your turning problems.

SENECA FALLS MACHINE CO., SENECA FALLS, N. Y.

PRODUCTION COSTS ARE LOWER WITH Lo-swing

Check Thread Accuracy...VISUALLY

WITH **Hanson-Whitney**

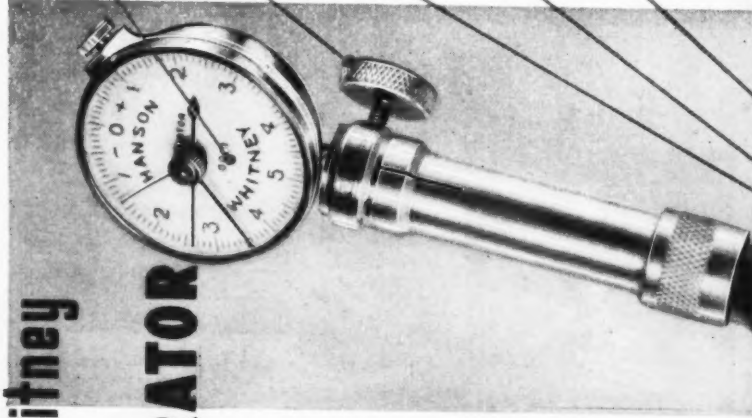
Precision

THREAD COMPARATOR

This precision instrument, expressly designed for production gaging, has proven itself since 1945 in checking all forms of threads including critical aircraft threads...and is now available to producers of external threads from 0 through $3\frac{1}{8}$ " diameter, coarse or fine pitches, in all classes. (Class 5 should be specifically requested.)

The indicator tells at a glance whether your product is over-size, under-size, eccentric, tapered, or if lead error exists. The work is recorded visually to accepted ring gage tolerances thus eliminating the human error-possibility of "feel".

Checking up to 20 pieces per minute



1. Indicator is equipped with tolerance hands and is graduated in tenths of thousands. Any type indicator with $\frac{3}{8}$ " shank may be used.
2. Comparator easily set to desired reading by loosening knob and lowering indicator. Tighten knob screw to lock indicator in correct position.
3. Lever controls positioning of upper anvil. Can be easily raised or lowered to insert or remove work. This action eliminates excessive wear on anvils.
4. Comparator is easily set - insert setting plug, lower upper anvil. Set indicator at tolerance required.
5. Thread anvils are actually a split internal thread member to check assemble-ability and to give exact reading on indicator dial of part checked within .0002 accuracy. Anvil

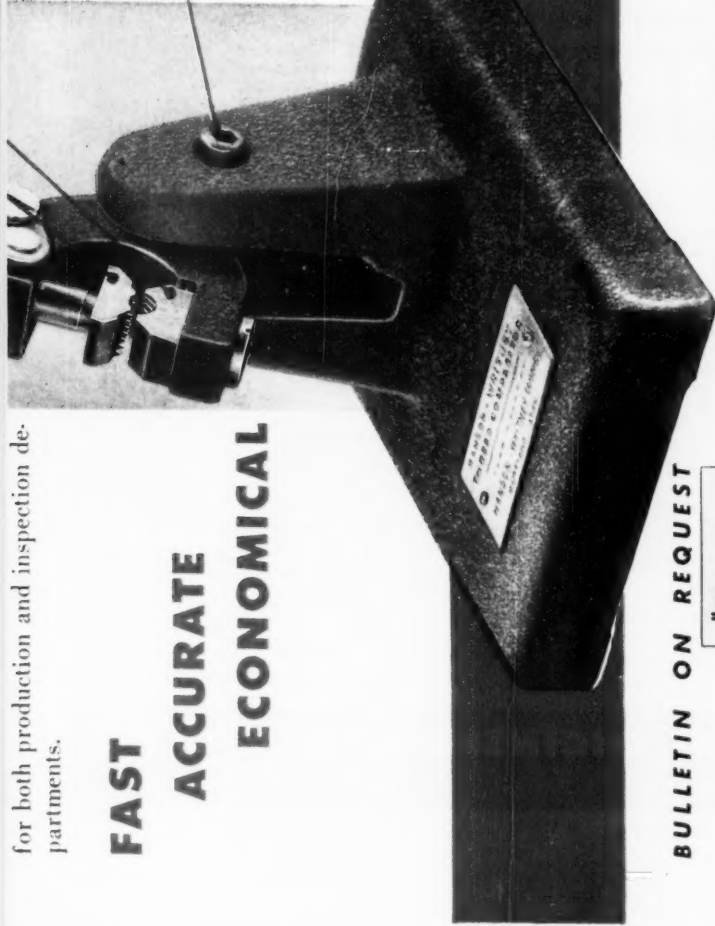
for both production and inspection departments.

FAST ACCURATE ECONOMICAL

to 4 and only one set plug (ot known P.D.) is required for all classes.

Standard recognized 2½ lb. pressure is maintained on work to hold it in reading position, eliminating human element while taking reading.

Complete gaging unit may be removed by loosening screw for change in size setting. Can also be used after removal for checking parts on machine. Complete removal and re-setting accomplished in less than three minutes.

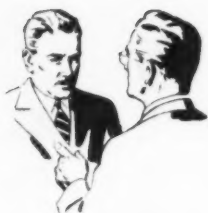


BULLETIN ON REQUEST



HANSON-WHITNEY COMPANY, HARTFORD 2, CONN.
DIVISION OF WHITNEY CHAIN COMPANY

Bulletin shows detailed various parts of the H-W Comparator (all available separately). Send for your copy today.



"IS YOUR PROBLEM
HOW TO CUT
PRODUCTION COSTS"

THE ANSWER IS

MODERNIZE...

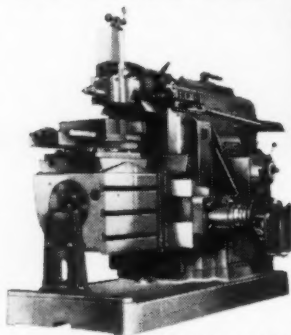
with

GEMCO

MATCHED FOR THE JOB

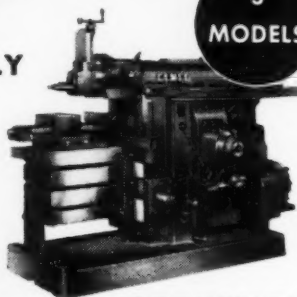
PRECISION SHAPERS

and BEAT COSTLY
OBsolescence!



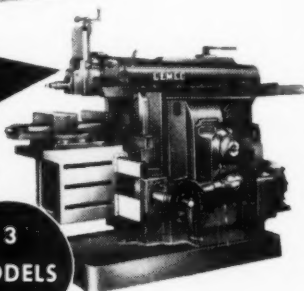
UNIVERSAL

Indicated for tool and die work and general machine shop work requiring frequent changes and angular settings. In sizes from 16-in. heavy duty to 36-in. standard duty, with Front Table support. LUBRIGARD protected.



PRODUCTION

Indicated for general machine shop use and heavy production work. In sizes from 16-in. heavy duty to 36-in. standard duty and with separate Table and Apron and with Front Table support. LUBRIGARD protected.



3
MODELS

PLAIN

For average machine shop use and light production work. Available in sizes from 16-in. heavy through 20-in. heavy duty. Equipped with plain table and with or without Front Table support. LUBRIGARD protected.

•
**WRITE
FOR BULLETIN
GC-13M**
•

• THEY'RE LUBRIGARD PROTECTED

GENERAL ENGINEERING & MFG. CO.

MANUFACTURERS OF PRECISION MACHINERY SINCE 1917

4417 OLEATHA AVE. • ST. LOUIS 16, MO.

SAVE TIME—SAVE MONEY WITH **famco** COST CUTTING **machines**



ARBOR PRESSES

In 32 stock plain lever, simple ratchet, combination compound and simple ratchet models, bench and floor types. Deliver up to 15 tons pressure.



DRILL PRESSES

Best buy in 15" drill presses. Complete line of single and multiple spindle models, bench and floor types. Many exclusive Famco features.

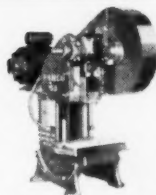


FOOT PRESSES

In 10 bench and floor type models of sturdy, semi-steel construction, accurately machined for trouble-free operation. Deliver up to 3 3/4 tons pressure.

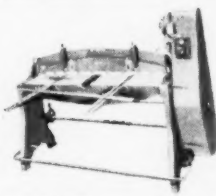
POWER PRESSES

Open-back, inclinable, bench and floor type. Heavy semi-steel, cast iron frame and drop-forged, one-piece crankshafts. Most models; highest quality in small presses.



SQUARING SHEARS

In 3 power and 5 foot models. Cutting widths 22" to 52". Capacity up to 18 gauge mild steel. Inexpensive, ruggedly built, many features.



METAL CUT-OFF BAND SAWS

High quality machine tool made in both dry and wet cutting models. Capacity up to 6" round and 6" x 12" rectangular stock. Many exclusive Famco features.



Designed for time-saving jobs . . . built for long-lasting performance and maintenance economy, Famco machines have earned the reputation of being the finest quality tools for the price. They are a development of nearly a quarter century of design and manufacturing experience . . . incorporate exclusive features not found on any other make regardless of price, and many found only in more expensive lines. The complete Famco Line is available through industrial equipment distributors everywhere.

FAMCO CATALOGS GIVE FULL DETAILS

We invite you to check your needs against the Famco Line, shown above, then write for catalogs on the products in which you are interested. There is no obligation.



FAMCO MACHINE COMPANY

SALES DEPT. 1320 18TH STREET

RACINE, WISCONSIN

September, 1950



BETTER SEEING

makes a Big difference
in **WORK OUTPUT**
REJECT LOSS
COST PER PIECE

LOCALITE

THE VITAL
SEEING ZONE
ON MACHINE OR
BENCH



MODEL 3267-H-174

Reflector orifice 5"x3 1/4". Takes 100 watt A-21 medium screw base lamp. Double arm with 3 instantly adjustable joints. Overall length 32 1/4". Wrinkled grey enamel finish. Flat oblong base. Wired with 8 ft. oil-resistant cord.

\$556 EACH in pkg. of 6
Single Units **\$6.95** ea.



MODEL 3470-P-172

Reflector orifice 6-9/16" dia. Takes 100 watt A-21 medium screw base lamp. Double arm with 3 instantly adjustable joints. Overall length 48 1/4". Wrinkled grey enamel finish. Circular base. Wired with 8 ft. oil-resistant cord.

\$652 EACH in pkg. of 6
Single Units **\$8.15** ea.

★ Write for free booklet on "Balanced Lighting" and complete catalog of Localite and Generalite models.

THE FOSTORIA PRESSED STEEL CORP.

FOSTORIA, OHIO, U.S.A.

Localites are available through
selected distributors everywhere

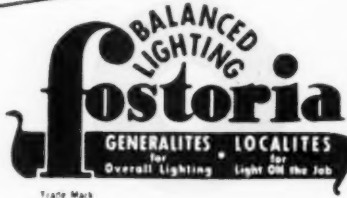
Small Investment Pays Big Dividends

The faster and better a worker sees, the quicker and more accurate his production. Good light on the critical work area is his most vital tool. Only with Localites can *both* ample illumination and *flexibility* for position be provided to direct the right illumination *exactly* as needed for the particular task.

So small is the investment required to Localite any jobs that even a few minutes time gained each hour by faster, better seeing pays steady dividends in lower-cost production and fewer rejects.

Thousands of plants are now profiting with Localite "seeing" tools. You, too, will see a big difference with a Localite on every precision task . . . bench and machine.

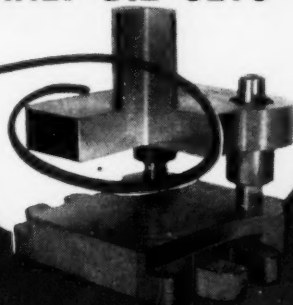
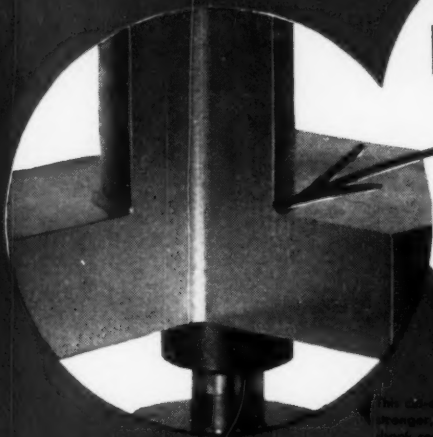
LOCALITES are available in a selection of 30 models with various type reflectors, arms and bases for every industrial need.



Trade Mark
Reg. U. S. Pat. Off.

This quality feature is STANDARD construction on all-steel shank type

DANLY DIE SETS



This close-up section shows the stronger, better Danly all-steel welded shank construction—the standard on the best part of the punch holder—all sold under

DANLY INTEGRAL WELDED SHANK

A new welding technique that assures 100% fusion of shank to punch holder makes this superior construction possible. Knock out holes in the shank itself or machining on the punch holder face are much less likely to effect shank strength.

Features like this make Danly the nation's leading die set producer. Check these other Danly Die Set advantages and you'll see why die makers and production men everywhere prefer Danly Die Sets

- Prompt Delivery • Precision Construction
- Broad Selection • Danly Reliability

DANLY MACHINE SPECIALTIES, INC.
2100 South Laramie Avenue, Chicago 50, Illinois

PRECISION DIE SETS... STANDARD AND SPECIAL



WHICH DANLY BRANCH IS CLOSEST TO YOU?

Danly Branch Offices: Chicago 50, 2100 South Laramie Avenue • Chicago 50, 30 East 12th Street • Chicago 50, 770 East Harrison Avenue • Chicago 50, 19 South Wabash • Chicago 50, 112 West Madison Street • Chicago 50, 47-20 57th Street • Los Angeles 20, 2000 West 10th • Los Angeles 20, 4800 South Main Street • Milwaukee 2, 111 East Wisconsin Avenue • Milwaukee 2, 18 West Center Avenue • Rochester 8, 54 Lombard Street • St. Louis 8, 1000 North 1st Street

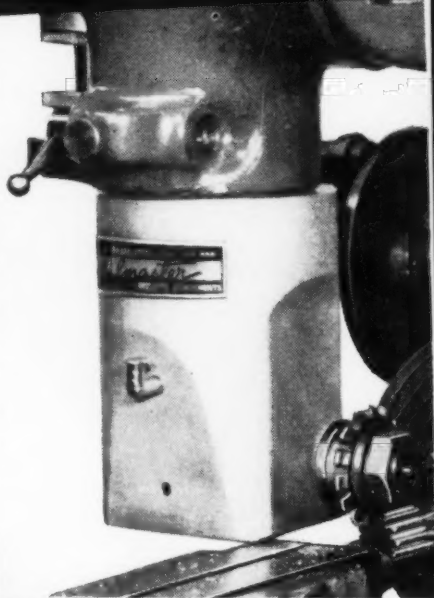


Milmaster

PAYS FOR ITSELF IN A FEW DAYS!

YOU CAN convert a horizontal or vertical milling machine into a universal miller... with a MILMASTER. This rugged, precision tool *doubles* your machine capacity... slashes set-up time by as much as two-thirds.

MILMASTER is built by one of New England's oldest metal working specialists and is bringing completely new efficiency and economy in service the country over.



MAIL COUPON NOW FOR
FULL INFORMATION

MILMASTER for horizontal
and vertical milling machines.

BEMIS & CALL COMPANY, 155 Main St., Springfield, Mass.

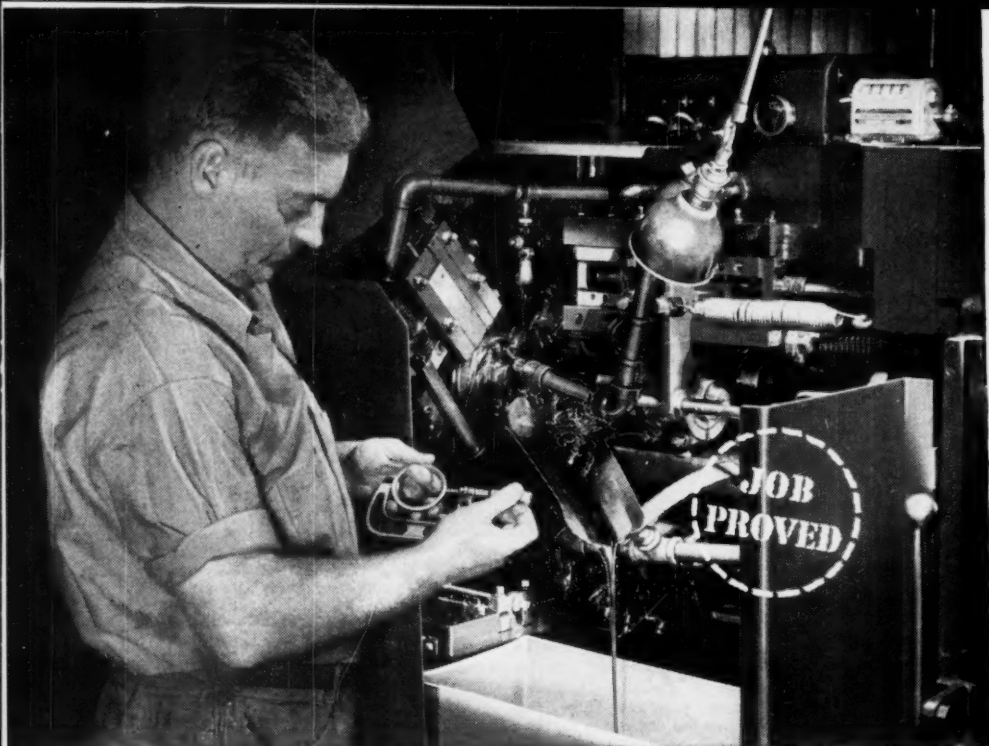
I am interested in more machine capacity. Please send me full details on the MILMASTER.

Name _____

Company _____

Address _____

City _____ Zone _____ State _____



ONE OIL DOES WORK OF TWO

**Dual-Purpose Sunicut Replaces Two Former Oils;
Dilution Ends; Finishes Improve; Tool Life Lengthens**

When one oil does work formerly requiring two... and with marked superiority... it doesn't make good sense to keep on buying two.

That is precisely why a prominent ball bearing manufacturer changed to Sunicut. He had been using one oil for lubricating his automatics, and another for cutting, but without complete satisfaction. The lube oil kept diluting the cutting oil by leaking into it. As a result, he got poor finishes and tool life was short. A Sun representative, called in to study the situation, advised using a dual-purpose grade of Sunicut. Adoption of his recommendation solved the problem.

For three years now, Sunicut has been

used by the entire automatic department with complete satisfaction. A year ago a switch was made to the *new* Sunicut with Petrofac, Sun's revolutionary all petroleum additive, and even better performance has resulted.

The new Sunicut grades, transparent and non-emulsifying, have been thoroughly "Job Proved." Excellent results are being obtained on automatics machining all types of steel and brass at all practical feeds and speeds. For further information, call or write your nearest Sun Office.

SUN OIL COMPANY • Philadelphia 3, Pa.

*In Canada: Sun Oil Company, Ltd.
Toronto and Montreal*

SUN PETROLEUM PRODUCTS

"JOB PROVED" IN EVERY INDUSTRY



Specify

POPE

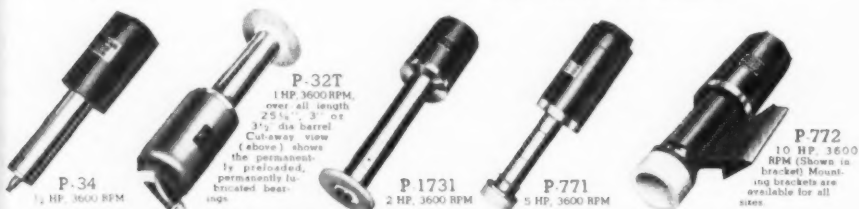
PRECISION SPINDLES



**Sealed Package
Direct Motorized
Cartridge Type
Precision Spindles**

Here's Why:

- POPE Spindles produce finer finishes.** They have the necessary massive construction and the radial and axial rigidity — two double-row, *super-precision*, cylindrical roller bearings and two separate ball thrust bearings.
- POPE Spindles increase production.** They have the power, the bearing capacity and the rigidity to carry a heavy cut. Rapid metal removal combined with superior final finish saves much operating time.
- POPE Spindles come in sizes to fit YOUR job.** They come in $\frac{1}{2}$, 1, 2, 3, 5, 7 $\frac{1}{2}$, and 10 HP and in 3600, 1800 or 1200 RPM to suit the work or the tool.
- POPE System of sealed-in lubrication** permits operation horizontally, vertically or at any angle — on boring mills, planers, millers, and other machine tools as well as on surface grinders.
- POPE Spindles require no maintenance costs** for lubrication or adjustments. This is just another bonus you get by specifying POPE Spindles.



When you want a Precision Spindle let us have your specifications and you'll receive a prompt reply including price and delivery. Ask for Data Sheet No. 12

No. 70

POPE

TRADE MARK REG. U.S. PAT. OFF.

POPE MACHINERY CORPORATION

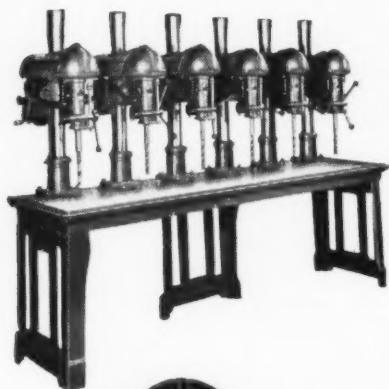
ESTABLISHED 1920

261 RIVER STREET • HAVERHILL, MASSACHUSETTS
BUILDERS OF PRECISION SPINDLES

Cut your production costs

WALKER-TURNER *designed* DRILL PRESSES

cover a wide range of
models, speeds, service



15" PRODUCTION MODEL

4 speeds: 600, 1250, 2440,
5000 r.p.m.

Spindle travel: 4 1/4"

Capacity: 18 1/2" chuck to
table.

Head Construction:
one-piece gray iron cast-
ing, line-bored for greater accuracy.

Compact, portable: can be located in
assembly lines, reducing handling costs.

Adaptable for sanding, grind-
ing, mortising, shaping and
many other metal and wood-
working operations. Bench and
floor models.



20" DRILL PRESS

6 Spindle, Hand Feed

Speeds: (5) 400, 800, 1200, 1800, 2600
using a 1740 r.p.m. motor.

Spindle travel: 6"

Capacity: 1"

Head Construction: one-piece gray iron
casting, line-bored for accuracy.

For the industrial user where the
production rate and initial cost are
primary factors. Particularly effec-
tive in increasing production on
many jobs where a series of holes
are to be drilled, tapped, reamed
or counter-bored in a single piece.
Other multiple-spindle models from
2 to 6 spindles.

SEE YOUR LOCAL DEALER for complete specifica-
tions on these and other metal and wood-working
power tools in the complete Walker-Turner line, or
mail coupon for new catalog.

Sold Only Through Authorized Dealers



WALKER-TURNER DIVISION

PLAINFIELD, NEW JERSEY

WALKER-TURNER DIVISION

Kearney & Trecker Corp., Dept. MT8,
Plainfield, N. J.

Send the complete Walker-Turner Catalog.

Name.....

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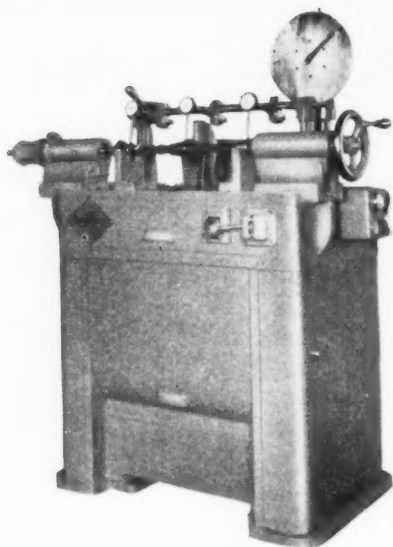
City..... Zone..... State.....

Drill Presses • Radial Drills
Tilting Arbor Saws • Belt & Disc Surfacers
Metal-Cutting Band Saws • Lathes
Spindle Shapers • Jointers

The New IMPCO STRAIGHTENER

FOR

- **CRANKSHAFTS**
- **AXLE SHAFTS**
- **CAM SHAFTS**
- **ROCKER ARM SHAFTS**
- **TRANSMISSION SHAFTS**
- **OTHER PARTS OF THIS TYPE**



This machine handles all types of straightening operations used on a production basis. It is fast, accurate and efficient. Loading and unloading time is cut to a minimum.

To operate, part is placed in machine and air centers engaged (centers are spring mounted), indicator bracket is lowered to register high spot on part, and the proper hook is pulled forward. Palm button is then pressed to engage circuit until large hand on dial comes to the proper setting determined by previous experience. Once the setting of the hand comes to the proper number on the dial, the palm button is released and the hook returns again to center.

Installation of this new straightener raised production of the operation illustrated from 45 camshafts per hour to 200 pieces per hour. Any number of hooks can be used for various types of work. Efficiency of straightening operations has been raised as high as 45% with this machine.

Construction features of the machine include the use of steel weldments for all structural members and the liberal use of Ampco Bronze Bearings. A "one shot" measured lubrication system is provided for all bearings. Easy accessibility to moving parts is provided by means of hinged doors and lift-out panels. External wiring is held to an absolute minimum. This presents a smooth, neat appearance which is easily kept clean as there are no overhead rotating parts to throw grease, or hydraulics to leak oil. Height of machine is so designed as not to interfere with overhead conveyors or other assembly operations. *

Specifications: 68" wide by 36" deep; 37 tons capacity; equipped with or without centers; mechanical operation. Your inquiry for information on how the "Impco" Straightener can answer your particular needs will receive prompt attention.



INDUSTRIAL METAL PRODUCTS CORP.
P.O. BOX 156

LANSING 1, MICH.



Section of Heat Treat Department at Taft-Pierce Mfg. Co., showing 3 of the 4 Sentry Furnaces used for H. S. S. Hardening.

EXCELLENT PRODUCTION

SENTRY H.S.S. HARDENING FURNACES and Sentry Diamond Blocks are used in the large heat treat department of the Taft-Pierce Mfg. Co., Woonsocket, R. I., for outside contract work as well as all their own high speed steel hardening. These furnaces, this company reports, are doing an excellent production job and giving full hardness and toughness to tools and cutters.

Sentry Furnaces are versatile, economical to operate and quick to heat up. They save on hardening costs and increase tool production and tool life. Produce a clean finish eliminating finishing operations. Adaptable for tool room or production hardening.

Write for full information. Ask for Catalog D18



The Sentry Company

FOXBORO, MASS., U.S.A.



**STILL
LEADER
OF ITS
CLASS!**

PRESS-RITE

**MODEL O 5 TON
POWER PRESS**

Compare it...

FEATURE FOR FEATURE!

- **HEAVY UNI-CAST FRAME**
Provides greater strength and ruggedness, for continuous 5 ton operation.
- **GREATER SHUT HEIGHT**
Full 7" to permit use of large bulky dies
- **4 POINT SLIDING KEY CLUTCH**
Eliminates lost flywheel motion and power. Increases production.
- **NON-REPEAT SINGLE STROKE SAFETY MECHANISM**
Builds operator confidence. Reduces rejects. Steps up output.
- **AUTOMATIC CAM ACTUATED BRAKE***
Instant braking at top of stroke. Full energy instantly on next stroke.
- **ANTI-FRICTION ROLLER BEARINGS***
Eliminates flywheel drag. Provides smoother action, and longer life.
- **OPEN BACK INCLINABLE**
Construction just like the larger Press-Rite Presses.

**Up to
30%
HEAVIER**

**MODEL O
Bench Model**



MODEL O Floor Model

**ONLY
\$175.00**

FOB ST. PAUL, MINN.
Base Price with Std. Equip.

**NOT JUST ANOTHER
5 TON PRESS...**

but a 5 ton press with features you'd expect to find only in larger presses... and it is only \$175.00 FOB St. Paul.

See it! Use it! You'll agree you have never had a press that could compare with it feature for feature... or match its outstanding performance.

See it at your dealer or
write for bulletin 348

* available at slight extra cost

Sales Service Machine Tool Co.



**PRESS
RITE
PRESSES**



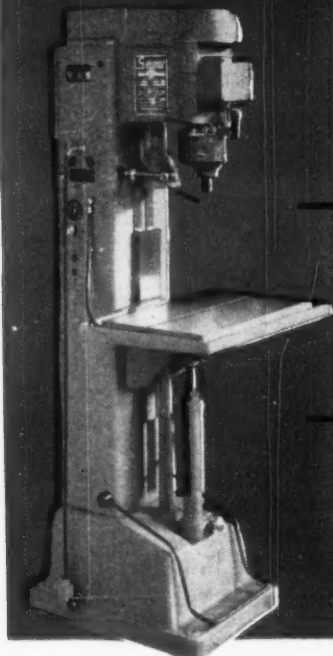
**SHAPE
RITE
SHAPERS**



**KELLER
POWER
HACK SAWS**

**2357 UNIVERSITY AVENUE
ST. PAUL 4, MINNESOTA**

*For Top
Production*



Snow air operated—electrically controlled machines have built in full universal controls that allow selection of the type of spindle cycle desired. This feature also permits instant synchronization of the standard Snow Master Fixtures. All types of air operated automatic and semi-automatic jigs and fixtures are carried in stock. Standardization permits low cost tooling—and—high production.

Sensitivity of power application prevents tool breakage.

Simplicity of control means that set up and operation can be handled by a less experienced operator with minimum fatigue.

SNOW

FULL UNIVERSAL MACHINES

Air operated, electrically controlled Snow tools are establishing amazing production records daily on a wide variety of work. Just note these typical examples:

DRILLING

Crossdrill and C" T" Sink 1/16" Hole

Material—Brass

Production—4800 per hour

Fixture—#15 Vertical index

Equipment—#1-UD Drilling Machine



TAPPING

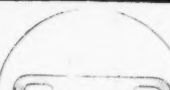
Tap Two #10-32 Holes

Material—Steel stamping

Production—3800 tapped holes per hour

Fixture—#14 horizontal index

Equipment—#1-UT tapping machine



THREADING

3/8"—24 Thread—1/2" Long

Material—Die Cast Aluminum

Production—2500 per hour

Fixture—#10 Drum dial

Equipment—#3-TR Threading machine



SNOW

MANUFACTURING COMPANY
435 Eastern Ave., Bellwood, Illinois
(Chicago Suburb)

Single Spindle Verticals • Two-Spindle Verticals • Two-Spindle Horizontals • Automatic Nut Tapping Machines • Drill Press Tap Heads • Automatic & Semi-Automatic Jigs & Fixtures

Submit Sample Parts for Production & Cost Estimates

THERE'S ONLY ONE WINNER—



...in the shop it's the
HERZBERG HEAD



Competition is the spirit of America. In any sporting event there is only one winner. In the shop, competition by comparison of production has proven the Herzberg Multiple Drilling and Tapping Head a consistent winner. Why not let us show you how the Herzberg Head can increase your production to a winning level.

Please send for our free Folders



Herzberg CORPORATION

633 E. CENTER STREET

MILWAUKEE 12, WISCONSIN



The Oliver Heavy
Duty Die Making
Machine.

PRESTIGE

Webster says "prestige" means the power to command respect and admiration. The prestige enjoyed by Oliver comes from actual users of Oliver machines over the years.

The Oliver Die Maker is just one example of how Oliver prestige has been attained. The Oliver Die Maker is saving thousands of man hours daily throughout industry by replacing the old obsolete hand die making method. Savings range from 50% to 60%.

The Oliver Die Maker saws, files and laps; is fast, accurate and simple to operate. This machine will definitely reduce your toolroom costs.

5 models available —

- No. 1. The Oliver Heavy Duty Die Maker (illustrated above) for sawing and filing tool steel up to 3" thickness.
- No. 2. The Oliver SP-2, SP-1 Die Makers for tool steels up to 1" thick. Floor model design.
- No. 3. The Oliver S-1, S-4 Die Makers designed for bench use. Capacity for tool steel 1" thick.

Write today for technical information on Oliver Die Makers.

OLIVER INSTRUMENT CO.

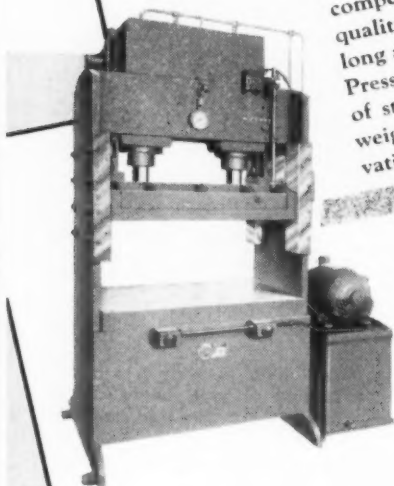
1408 E. MAUMEE • ADRIAN, MICHIGAN

AUTOMATIC DRILL GRINDERS
TOOL & CUTTER GRINDERS—DRILL
POINT THINNERS—TEMPLATE
TOOL GRINDERS—FACE MILL
GRINDERS—DIEMAKING MACHINES

Standout production performance!
Outstanding production economy!

KRW HYDRAULIC PRESSES ENGINEERED FOR PLUS-PROFITS

Operational efficiency to chisel in on tough competition! Priced for terrific economy — quality that keeps on multiplying profits long after cost has been amortized. KRW Presses are self-contained and fabricated of steel for maximum strength, minimum weight and space conservation. No excavations or elaborate foundations required.



Low price gets high priced features

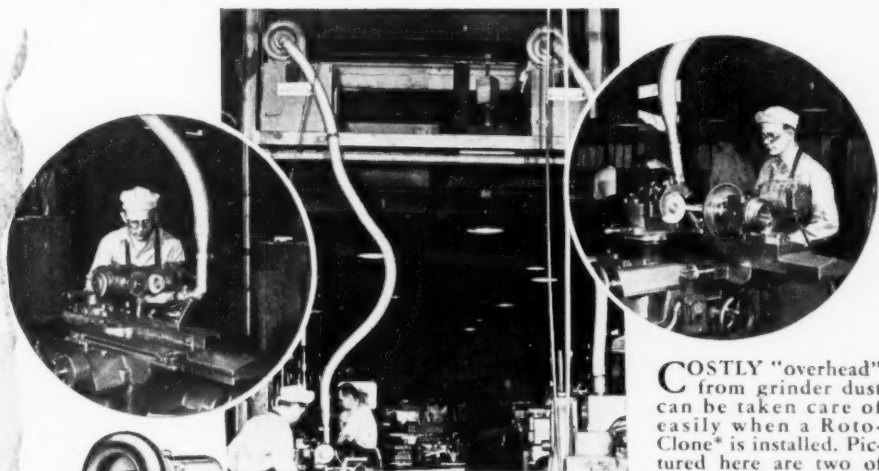
Heavy steel plate construction. Precision honed cylinders. Adjustable tonnage pressure control. Adjustable limit switch for top return position of ram. Safety by-pass prevents overloading beyond maximum rated capacity. Large self-contained oil reservoir. Direct connected motor drive to pumps through easily serviced flexible couplings. Safety controls prevent accidents. Long life bronze faced gibs adjustable for wear insure accurate travel of slide. Presses can be custom built to meet your manufacturing requirements. Quiet and vibrationless in operation. Write or wire for full facts and low prices.

Two Cylinder Type
Tons capacity 60 85 100. Platen and bolster, maximum usable size, F to B, R to L, 36" x 60". Stroke 6" 11". Bed, fixed. Controls: Manual, Semi-Automatic, Fully Automatic for cycled operation.

K·R·WILSON
215 MAIN ST.
BUFFALO 3, N. Y.

ROTO-CLONE*

takes care of grinder dust "overhead"



COSTLY "overhead" from grinder dust can be taken care of easily when a Roto-Clone* is installed. Pictured here are two of American Air Filter's

Type D Roto-Clones, Self-Contained units, located overhead, away from machines, so valuable floor space is not sacrificed. Two different hood designs collect the dust—one from a shaft grinder, another from a surface grinder.

Dust is drawn into the hopper on which the Roto-Clone is mounted. A drawer in the hopper holds the dust, until it is removed—disposal is simple, safe and fast. Part of this Self-Contained Roto-Clone is a plenum chamber which houses a filter after-cleaner. The exhaust air is filtered and returns as clean air into the work room. Workers' health is protected; heat is conserved; there's more production per machine with Roto-Clone on the job.

There's a clean saving with a Type D Roto-Clone—the Dynamic Precipitator originated by AAF engineers. It can be installed as a central system or as an individual unit to serve a single dust-producing operation. If you are not using this method for dry collection of granular dust, then call a dust engineer for complete information, available through your nearby American Air Filter representative or write for Bulletin No. 275.

ROTO-CLONE • DUST CONTROL EQUIPMENT

*Roto-Clone is the trade mark (Reg. U. S. Pat. Off.) of the American Air Filter Company, Inc., for various dust collectors of the dynamic precipitator and hydro-static precipitator types.



American Air Filter

COMPANY, INC.

312 Central Ave., Louisville 8, Ky. • In Canada: Darling Bros., Ltd., Montreal, P. Q.

NOW . . . USING STEEL PLATE SHAPES IS

EFFICIENT

You start one step ahead—that much nearer the finished job—with By-Products steel plate shapes. Flame-cut, sheared, bent, pressed or blanked to close tolerances, they're ready for quick finishing and assembly.

ECONOMICAL

You save on scrap loss and scrap handling. You buy only what you use and are given scrap credit at the mill where value is highest. And, you get greater output without increasing your investment in plant equipment.

EASY

Whether you need one piece or thousands, just send a blueprint for a free quotation, and compare your shaping time and materials cost with By-Products' prices. Address By-Products Steel Co., 515 Strode Avenue, Coatesville, Pa.

Plate that's shaped to save you money

BY-PRODUCTS STEEL CO.

A DIVISION OF LUKENS STEEL COMPANY

LUKENS

A New High IN DRILL CHUCK ENGINEERING

■ New precision standards, longer life, easier operation, fool-proof action—they're features of the new Ettco-Emrick Keyless Drill Chuck.

There's no slipping, no damaged drill shanks—the grip is always tight and true. Yet only a slight twist of the chuck body is needed to release the drill.

You need a chuck that's tops in simplicity and design. Save time! Save money! Ask your Industrial Distributor for the new Ettco-Emrick Keyless Drill Chucks and Shanks.

ETTCO TOOL CO., INC.
596 JOHNSON AVENUE
BROOKLYN 6, NEW YORK

■ Fully described in bulletin #7.



RECIPE FOR A Better DRILL BUSHING!

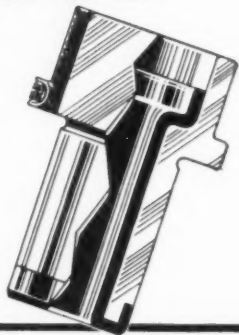
Take a hole and wrap
high quality bushing
material around it for
longer life ★ lower cost



Revere REVOLUTIONARY DRILL BUSHINGS

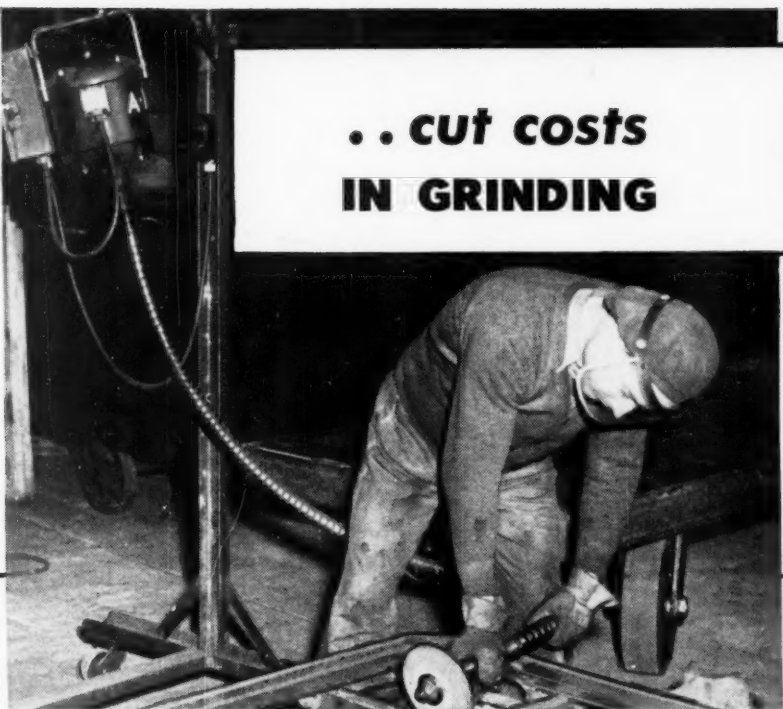
Yes . . . that's what we actually do . . . wrap
high quality bushing material around a hole
and presto . . . Revere Revolutionary Drill
Bushings are born.

Revere bushings have all the accuracy of solid
type bushings with a wearing surface of high
grade material. Assembled in a die cast body.
Revere bushings last longer . . . lower cost . . .
A new service . . . and are assembled from
complete stocks near you.



Revere Fisher ENGINEERING COMPANY
LEXINGTON, MICHIGAN

.. cut costs IN GRINDING

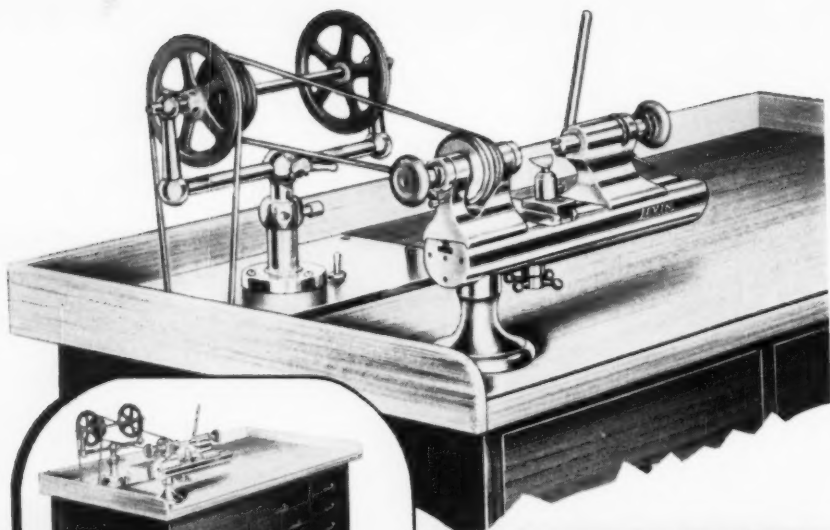


Haskins Flexible Shaft Machines cut costs in all grinding, sanding, filing, buffing, polishing and similar operations. Full-powered, long-lasting Haskins equipment increases production per man-hour . . . helps you set new standards for quality. Send for information on the complete Haskins line—from light-weight, direct-drive machines, to heavy-duty, multi-speed units. R. G. Haskins Co., 2645 W. Harrison St., Chicago 12, Illinois.

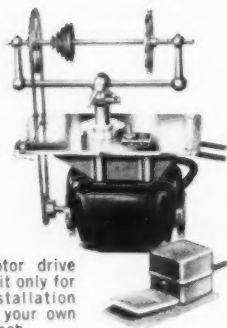


haskins

FLEXIBLE SHAFT EQUIPMENT



Lathe with complete bench and motor drive.



Motor drive unit only for installation in your own bench.

LEVIN

AMERICA'S FINEST PRECISION JEWELER'S LATHES

Widely acclaimed as ideal for instrument work, second operations for production, tool work or experimental work and model making. Collet capacity 3/16" or 5/16".

Available with motor drive and bench or for separate mounting. Send for complete catalog and prices of lathes and accessories.

LOUIS LEVIN & SON, INC.
782 East Pico Blvd.
Los Angeles 21, Calif.

TIME-MONEY SAVING

Accuracy



AT YOUR FINGERTIPS

A must for your bench — Horberg Drill Size, Pin Gages. Unlimited time and cost saving advantages in center and location finding, hole or slot gaging.

- Held Accurate to $\pm .0001$ — $.0000$
- Concentric tapered to fit holes $.0012$ smaller than gage size.
- $1\frac{1}{2}$ " in length for easy insertion
- Highest quality oil hardened tool steel
- In convenient indexed stand for quick selection

Letter sets of 52 gages, A-Z in pairs

Fraction sets of 60 gages, $3/64$ " to $1/2$ " in steps of $1/64$ " in pairs

Number sets of 120 gages, 1 to 60 in pairs

Individual gages in stock

Extra stands available

All Items Stocked for Immediate Delivery

FROM

THE *Horberg* GAGE COMPANY

Quantity

21 STAPLES ST., BRIDGEPORT, CONN.

..... Letter Sets @ \$45.

Please Rush checked items and literature to

..... Fraction Sets @ \$50.

Company.....

..... Number Sets @ \$90.

Address.....

..... Single gages @ \$ 1.

Name.....

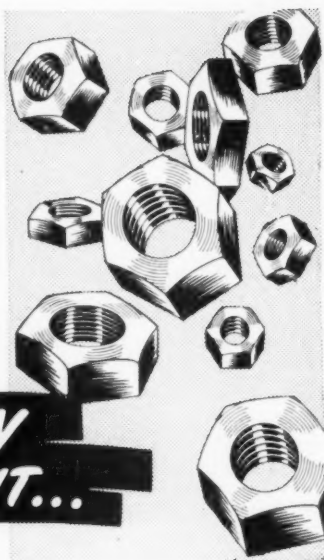
..... Stand alone @ \$10.

Title.....

FROM 25-125
erratic threaded holes
per tap

TO 22,000
clean class 3 threaded
holes per tap

**HERE'S HOW
HY-PRO DID IT...**



PART: 18-8 stainless steel hex nut with *punched hole*

PROBLEM: Tapping with a 10-24 tap, a leading nut manufacturer experienced difficulty holding size and was troubled with excessive tap breakage. *Then They Called in the HY-PRO Sales Engineer*

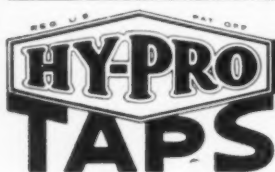
HY-PRO SOLUTION: His recommendation was a standard Hy-Pro 10-24 machine screw tap with one of the exclusive Hy-Pro surface treatments for wear and lubrication. Speed and cutting oil were adopted from extensive tables in Hy-Pro catalog. Production with Hy-Pro taps now averages 22,000 burr-free *Class 3* threaded holes at 62 nuts per minute.

Above is a typical example of how the Hy-Pro Sales Engineer can help increase threaded-hole production. His expert engineering counsel backed by the most up-to-date tap production methods combine to solve tapping problems rapidly and profitably.



Let Hy-Pro solve your tapping problem —
call a Hy-Pro Sales Engineer today.

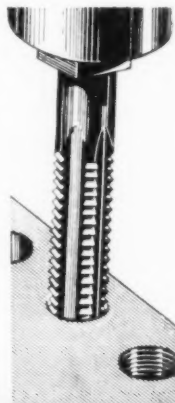
Order from your Distributor



HY-PRO TOOL CO.

NEW BEDFORD, MASSACHUSETTS

A SUBSIDIARY OF CONTINENTAL SCREW COMPANY





What Do YOU Need In a CLUTCH?

A spring-loaded, over-center, multiple-disc, single or double-plate type? Gear-tooth or splined-to-shaft drive? Compact design? High torque rating? Shock-load absorption? Slip-page control? Vibration dampening? Frequent drive shaft reversals? Regardless of your needs, ROCKFORD engineers are in a position to specify a size and type clutch that will meet your requirements exactly. You may say "No" to their recommendation, but don't risk not having the benefit of it.

ROCKFORD

Light Over-Center

CLUTCHES



ROCKFORD CLUTCH DIVISION

BORG-WARNER

1309 Eighteenth Street, Rockford, Illinois

NO MORE

hacksawing
drudgery that
everybody hates.



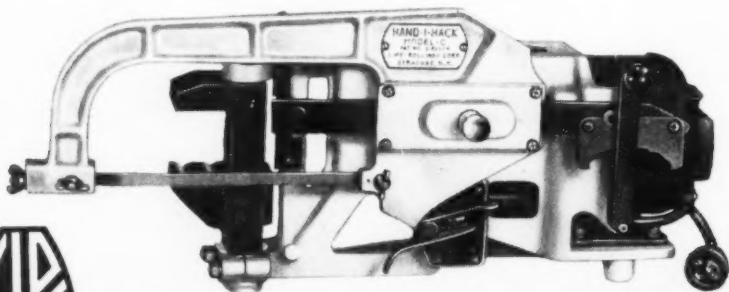
NOW!

HAND-I-HACK*

*Trade Mark
Reg. U. S. Pat. Off.

**PORTABLE POWER
HACK SAW**

Hand-I-Hack will eliminate this drudgery. It's light—easily carried to the job. It will work in any position. It will pay for itself quickly in labor saving and broken blade costs alone. Capacity 3" x 3". Write for literature

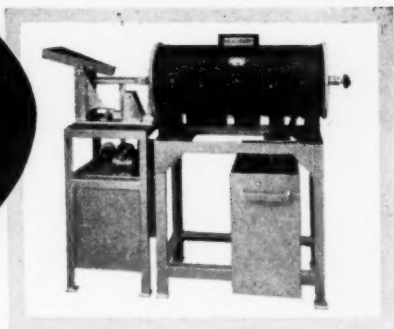


Lipe-ROLLWAY CORPORATION

816 Emerson Ave.

Syracuse, N. Y.

BRIGHT { CARBURIZING
CYANIDING
HARDENING
WITH THE NEW **HEVI DUTY**
SHAKER HEARTH FURNACE



This Hevi Duty Shaker Hearth Furnace can be used with an atmosphere generator to produce work that is clean and bright. Results are consistently excellent. It can heat treat a variety of parts from small screws and washers to relatively large stampings. Simple construction and easy access to all parts mean less maintenance expense.

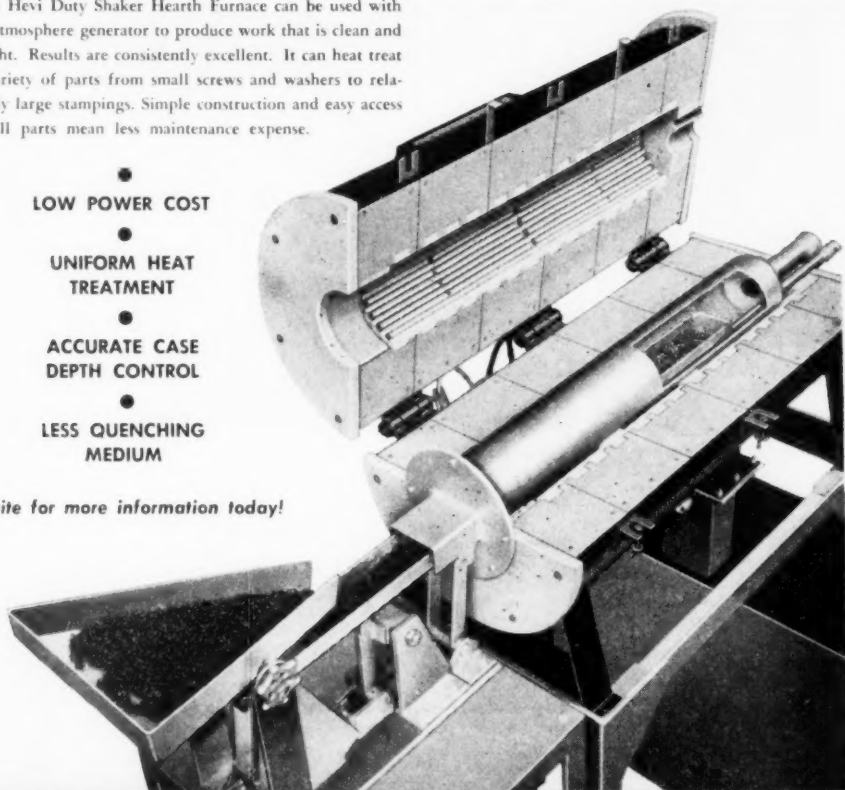
●
LOW POWER COST

●
UNIFORM HEAT TREATMENT

●
ACCURATE CASE DEPTH CONTROL

●
LESS QUENCHING MEDIUM

Write for more information today!



HEVI DUTY ELECTRIC COMPANY

HEAT TREATING FURNACES **HEVI DUTY** ELECTRIC EXCLUSIVELY

DRY TYPE TRANSFORMERS — CONSTANT CURRENT REGULATORS

MILWAUKEE 1, WISCONSIN

CUT DIAMOND AND GRINDING COSTS 50% ON CINCINNATI CENTERLESS GRINDERS

With the new **CITCO** Hydraulic Automatic — Adjustable **DIAMOND** **TURNER**



Cincinnati Centerless Grinder showing Citco Hydraulic Diamond Turner installation.

If you have one or a battery of Centerless Grinders, you owe it to yourself to check the following points against your present operation —then figure it for yourself, how **CITCO** saves you money! • Maintains sharp diamond and fast cutting wheel at all times • Necessitates dressing 60% less often—consequently more pieces per dress • Longer diamond life, longer wheel life • Holds positive form, size and straightness • No shifting



Send for Citco
Diamond Turner
brochure today.

of cam • Diamond is always on center. The Citco Diamond Turner is precision built and made to last the life of the machine of which it becomes a rigid and permanent member. All moving parts sealed in oil.

Jeweled CITCO Masterpieces

Citco Solid Copper Diamond Tools give you higher performance. Write for Citco Diamond Tool catalog.

"They're
Cool"

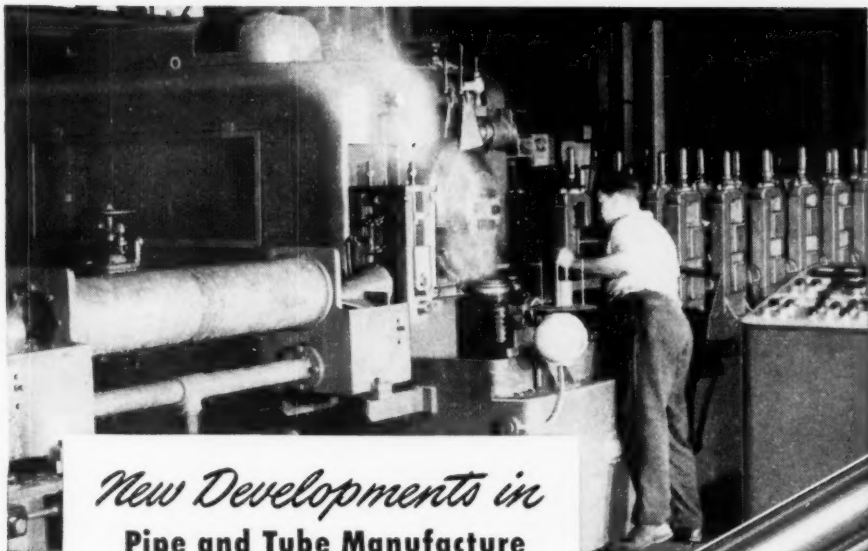


CITCO

"Saves your Diamond Dollars"

Cleveland Industrial Tool Corp.
1080 East 222nd St., • Cleveland 17, Ohio

Manufacturers of Citco Solid Copper Diamond Tools...They're cool.



New Developments in **Pipe and Tube Manufacture**

By highly important recent engineering developments in Yoder Pipe and tube making equipment, the capacity range has been extended upwards for higher speed and tonnage, and, significantly, also downwards for slower speed, with correspondingly lower initial investment and breakeven point.

One result is that many territories and countries which, due to limited local demand, have heretofore been dependent entirely on imports, at excessively high freight costs, may now profitably make their own tubular goods in a variety of sizes.

Small-tubing users may acquire compact, efficient Yoder mills at prices ranging from about \$40,000 up, while big commercial operators may meet competition most successfully with high-speed, high-tonnage mills.

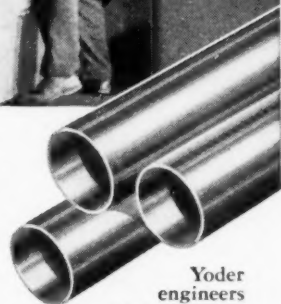
Technological advances include adaptations of submerged arc and induction welding, as well as tube forming in hydraulic presses. However, cold roll-forming and resistance-welding, now as in the past, continue first choice for many applications.

THE YODER COMPANY

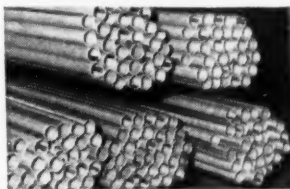
5509 Walworth Avenue • Cleveland 2, Ohio

Complete Production Lines

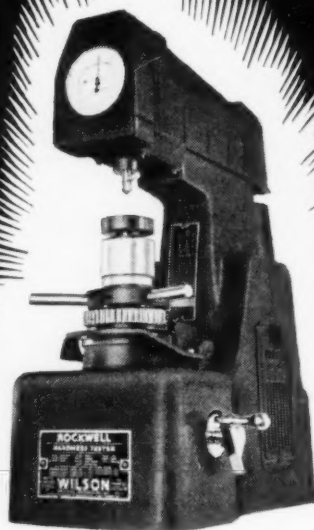
- ★ **COLD-ROLL-FORMING** and auxiliary machinery
- ★ **GANG SLITTING LINES** for Coils and Sheets
- ★ **PIPE and TUBE MILLS**—cold forming and welding



Yoder engineers are at your service in recommending the type of equipment best suited to your needs . . . Literature and further information on request.



*What Price
Accuracy?*



• Immediately a "ROCKWELL" or "TUKON" Hardness Tester is put into use, its purchase price becomes its least important feature. From then on the only measure of value is the accuracy of every test made.

The dependable, enduring accuracy of all Wilson hardness testing equipment is assured by Wilson's long experience, the Wilson Standardizing Laboratory and Wilson Field Service Engineers. In terms of hardness testing service, Wilson offers you most for every dollar you invest.

Write for catalog RT-46 on the "ROCKWELL" Hardness Tester and Bulletin DH-7 on microhardness testing with the "TUKON" Tester.



BRALE is the only diamond indenter made to Wilson's precision standards for use on "ROCKWELL" Hardness Testers and "ROCKWELL" Superficial Hardness Testers.

WILSON

MECHANICAL INSTRUMENT CO., INC.

AN ASSOCIATE COMPANY OF AMERICAN CHAIN & CABLE COMPANY, INC.

ACCO



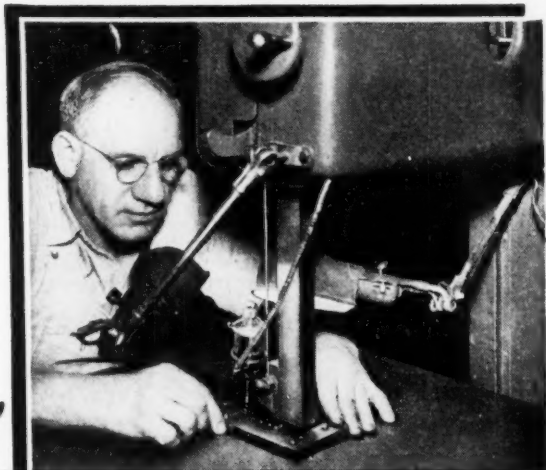
230-T PARK AVENUE, NEW YORK 17, N. Y.

Specify ATLANTIC

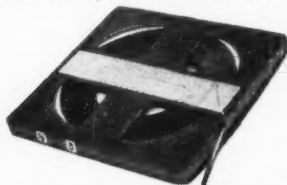
BAND SAW BLADES

For Smoother

CONTOUR CUTTING



*A*TLANTIC SAWS meet all of your requirements for a superior blade on complicated die and fixture radius cutting. ATLANTIC specializes in accurate milled and precision set teeth, hardened to exact temper.



Atlantic's strong, practical box, plainly marked on sides and top. Remains in good condition until entire coil is used.

ATLANTIC'S special alloy steel insures longer wear and easier welding.

ATLANTIC'S one temper saw for all metals reduces stock you have to carry. Cut to length and welded, ready for use. Packed in strong Atlantic box. Write for new Atlantic Catalog.

Atlantic Saw Mfg. Co.

INCORPORATED

Exclusively Manufacturers of Band Saw Blades

153 Brewery St., New Haven, Conn.

**Die Smashed?
Shaft Broken?
Bearing Frozen?
Operator Idle?**

IT CAN'T HAPPEN with PROTECTRON

You can turn waste production costs into profit with PROTECTRON. This inexpensive electronic control automatically "trips" machines at the slightest mechanical overload from whatever cause before damage occurs. An investment in

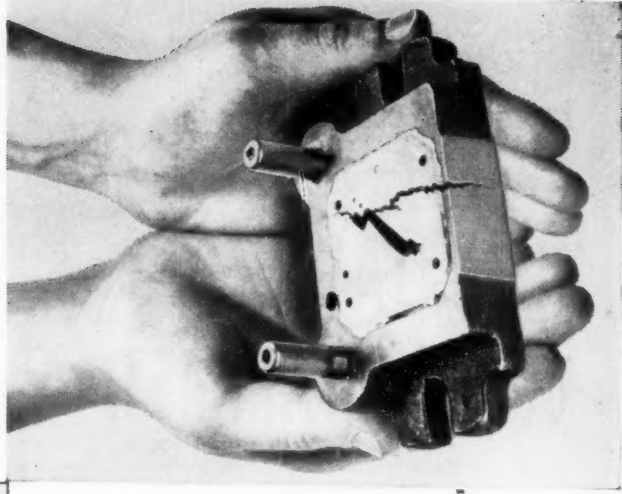
PROTECTRON WILL REDUCE:

- Your press room budget
- Costly "Down Time"
- Your operating overhead

necessary "down time" and other costly waste. In addition PROTECTRON saves manpower. PROTECTRON installation enables one man to operate four machines, freeing three men for other work. Quite a saving! A demonstration right in your own plant will prove how much PROTECTRON can save you. There is no obligation. Just write, wire or phone.

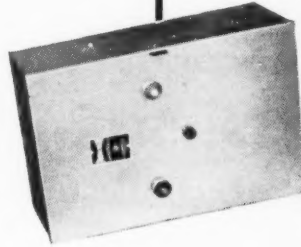
- Broken dies
- Broken tools and machinery
- "Piece work abuse"

**PROTECTRON HELPS YOU
MEET AND BEAT
COMPETITION**



"No single device saves you so much, so quickly at so little cost" say users of:

Automatic presses • Eyelet machines • Milling machines
Automatic screw machines • Conveyor systems • Conveyorized
machinery • Drilling machines • Mixers and agitators
Broaching machines • Packaging machinery • Special machinery



The Brinnell Company

GRANBY, CONN.

in the toolroom...

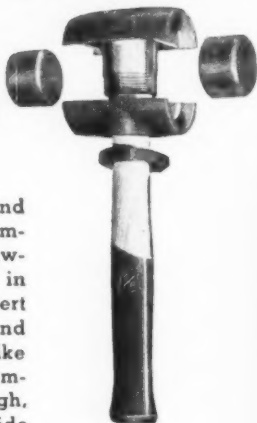
C/R's

NEW JAW-HEAD Rawhide HAMMER

adds new convenience to the safety and protection of Rawhide

Men in the toolroom find C/R's new Jaw-Head hammer a real time-saver. Rawhide faces are replaced in a jiffy—loosen a nut, insert new faces, tighten nut and they are held in a vise-like grip. C/R Jaw-Head hammer faces are made of tough, resilient waterbuffalo hide ... superior in their ability to absorb shock, deliver powerful blows, and protect delicate finishes. Safety-Flare grip handle prevents slipping. For safety, economy and power, get the new C/R Jaw-Head Rawhide hammer!

- Other C/R striking tools:
Rawhide Mallets, Rawhide Mauls, Solid Head Rawhide Hammers.



- Out with the old face — in with the new!



To release jaws, loosen this nut.



Change to new C/R Rawhide faces.



To tighten nut, use wrench for best results.

Available from leading Industrial Suppliers.

CHICAGO *Rawhide* **MFG.CO.**
1321 Elston Ave. Chicago 22, Illinois

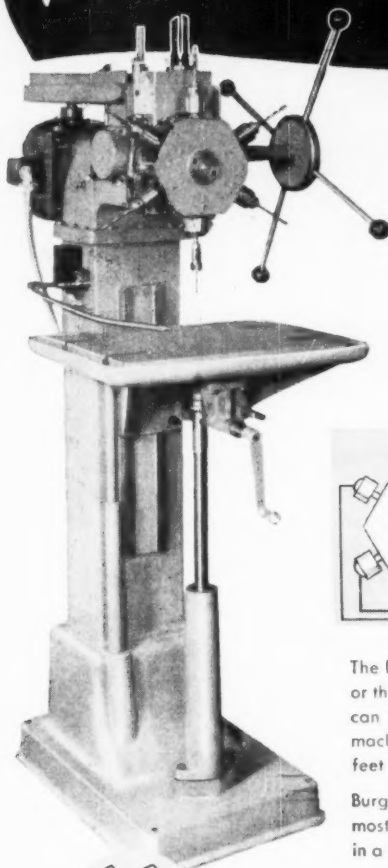
THE

Burgmaster

SIX SPINDLE

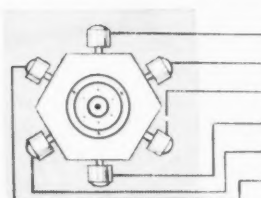
TURRET TYPE AUTOMATIC INDEXING
DRILLING and TAPPING MACHINE

GIVES YOU **6** MACHINES
IN ONE!



Burgmaster A Universal Type
Production Machine, features

- ★ 8" STROKE
- ★ PRE-SELECTIVE SPINDLE SPEEDS
- ★ INDIVIDUAL PRECISION DEPTH STOPS
- ★ 110 VOLT CONTROLS
- ★ 2-SPEED MOTOR
- ★ ADJUSTABLE FEED HANDLE
- ★ 9 1/4" THROAT CLEARANCE
- ★ 15" x 21" TABLE WORK SURFACE WITH T SLOTS



Drilling
Reaming
Tapping
Threading
Counter Boring
Spot Facing

The Burgmaster enables one operator to do the work of two or three and get the job done faster, better. A variety of jobs can be handled without moving the work piece from the machine table. It is simple to set up, requires but 6 square feet of floor space and is powered by a single motor.

Burgmaster users will tell you that their Burgmaster is the most economical machine in their shop, and pays for itself in a short period.

Write today for detailed information.

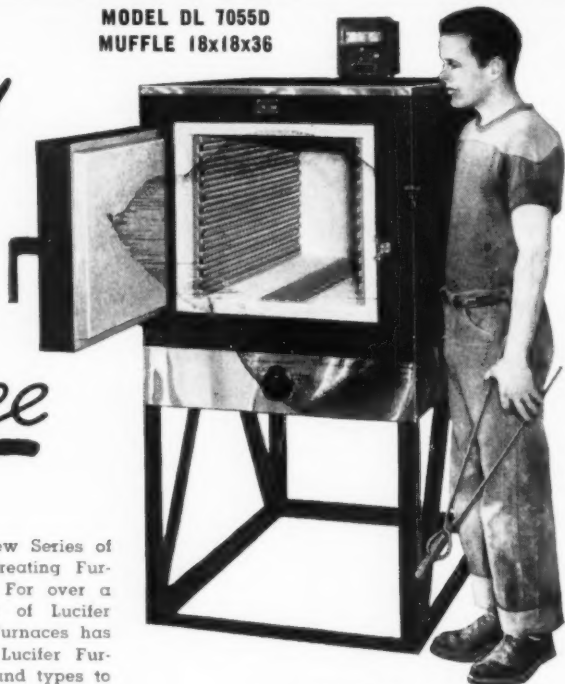


BURG TOOL MANUFACTURING CO.

3743 DURANGO AVE., DEPT. BB-4 • LOS ANGELES 34, CALIF.

*Try
It
Free*

MODEL DL 7055D
MUFFLE 18x18x36



Now you can try a new Series of Lucifer Electric Heat Treating Furnaces absolutely free! For over a year the manufacturer of Lucifer Electric Heat Treating Furnaces has quietly been shipping Lucifer Furnaces of various sizes and types to a number of nationally known concerns on a strictly trial basis. The amazing thing is that we can furnish an affidavit to the effect that not one of these Lucifer Furnaces has been returned. Each one was bought and paid for at the regular advertised price. Now you too can try a Lucifer and see why they are rapidly coming to the fore as a leader in electric heat treating furnaces. Write for details of this amazing offer. One Lucifer Furnace can be used for regular hardening — case hardening — drawing — tempering, etc.

New Series
LUCIFER
ELECTRIC HEAT TREATING
FURNACES

These new Series Lucifers incorporate new controls, so that the furnace may be brought up to the desired heat as slowly or rapidly as desired. Cooling time likewise may be controlled in the same manner.

Prices run from \$399.95 for the 6"x6"x12" to \$1229.25 for the 18"x18"x36".

Write for free Literature. Dealers Inquiries solicited.

GILBERT S. SIMONSKI SOLE MANUFACTURERS
401 N. BROAD ST. PHILADELPHIA 8, PENNA.

When you design mechanical drives and controls

... figure on

S. S. WHITE Flexible Shafts



A slide rule is a quick and effective time-saver in working out mathematical problems. By the same token, an S.S.White flexible shaft is an efficient, dependable shortcut in working out problems involving the transmission of rotary power and mechanical remote control.

The point is, an S.S.White flexible shaft is a completely self-contained highly versatile mechanical element which can be readily adapted to practically every space and operating condition. It is easily installed, out of the way, and can be run along body contours and around intervening obstacles.

Figure on using S.S.White flexible shafts on your accessory drives and controls — and they offer savings in time and money, simplified assembly and manufacturing operations and completely dependable service. For details,

WRITE FOR BULLETIN 4501 It contains basic facts and data on flexible shaft selection and application. Copy sent on request. Write today.



S.S. WHITE

THE S. S. WHITE DENTAL MFG. CO.

INDUSTRIAL

DIVISION

DEPT. H, 10 EAST 40th ST., NEW YORK 16, N. Y.



FLEXIBLE SHAFTS AND ACCESSORIES
MOLDED PLASTICS PRODUCTS—MOLDED RESISTORS

One of America's AAAA Industrial Enterprises

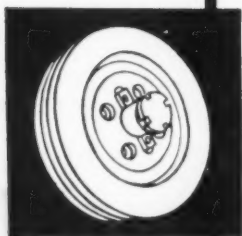
LOVEJOY Flywheels

IMPROVE

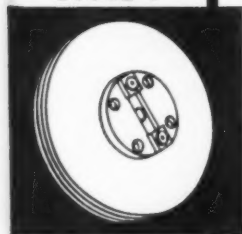
milling cutter performance

INCREASE

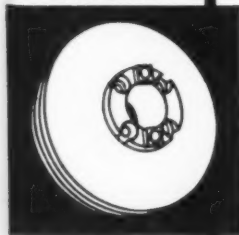
cutting blade life!



STYLE 1



STYLE 2



STYLE 3

YOU can increase milling production, improve accuracy and lengthen blade life by using Lovejoy Flywheels. Steel cutting is as smooth as silk, and other metals are usually cut easier and faster with the help of these patented Flywheels. One manufacturer reports a 10-time increase in blade life. Others report complete elimination of chatter with resulting improvement of surface finish. Still others have proof of reduced H.P. requirements.

Lovejoy Flywheels are available for mounting on the spindle of any machine . . . Style 1 for driving shell end mills; Style 2 for bolt-on mills; Style 3 for bolt-on or National Standard arbors.

The Lovejoy Flywheel Bulletin gives full details, specifications and prices.



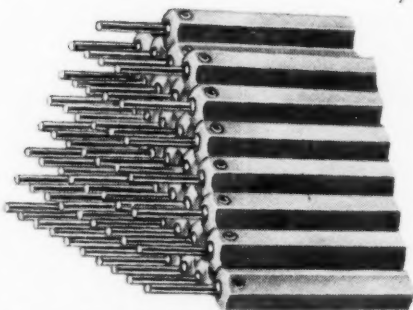
Write for Details!

Lovejoy
TOOL COMPANY, INC.

136 MAIN ST., SPRINGFIELD, VERMONT

Van Keuren

CARBOLOY Wire Type PLUG GAGES *are the right answer*



1 VK CARBOLOY = 50 TOOLSTEEL GAGES

After considerable experimentation with various wear resistant materials, we have chosen Carboloy as being the most practical, durable and economical. Carboloy does not flake or chip easily and is quite suitable for wire type plug gages as small as .020" in diameter.

Wire Type Plug Gages were originated by the Van Keuren Co. in 1925 and are now recognized as the most economical gages for measuring small holes. The original wire type plug gages were made of tool steel—High Speed steel doubled gage life. VK Chromium Plate gave 5 times the life, and VK Carboloy 50 times the life of tool steel gaging units. All of these materials are still in use and have their particular applications.

VK Carboloy gaging units are made in sizes from .020" to .500" diameter. They are made only in the wire type design because this is by far the most economical plug gage. In cases where it is desired to use VK Carboloy wire type Go units with existing No Go taper insert units, special handles can be furnished for this purpose.

Van Keuren Wire Type Plug Gages assure longer lasting precision and lower gage cost, because the entire 2" length of gage can be used. When the end of the wire becomes worn it is ground off. The wire type unit is securely held in the unit by a split bushing and a headless set screw.

VK Carboloy Wire Type Plug Gages are made to Class B accuracy, plus .00005" minus .00000" on the Go unit and plus or minus .000025" on the No Go unit. Closer or wider tolerances can be supplied if desired.

On your next order Specify VK Wire Type Plug Gages: VK Carboloy for long runs because of the enormous saving in gage cost; VK Carboloy for fussy jobs because of the infinitesimal gage wear and insurance that the parts will be within the specified limits; VK Tool Steel—High Speed Steel—Precision Chromium for less exacting jobs. You will be assured of the best in accuracy, quality and delivery.

VK CATALOG AND HANDBOOK No. 34



This 208 page volume represents 2 years of research sponsored by the Van Keuren Co.

It presents for the first time in history a simple and exact method of measuring screws and worms with wires.

It tells how to measure gears, splines and involute serrations. It is an accepted reference book for measuring problems and methods.

Copies free upon request.

THE Van Keuren

31st YEAR

CO., 177 Waltham Street, Watertown, Mass.

Light Wave Equipment • Light Wavy Micrometers • Gage Blocks • Taper Insert Plug Gages • Wire Type Plug Gages • Measuring Wires • Thread Measuring Wires • Gear Measuring System • Shop Triangles • Carboloy Plug Gages • Carboloy Measuring Wires

CHICAGO

Powerful

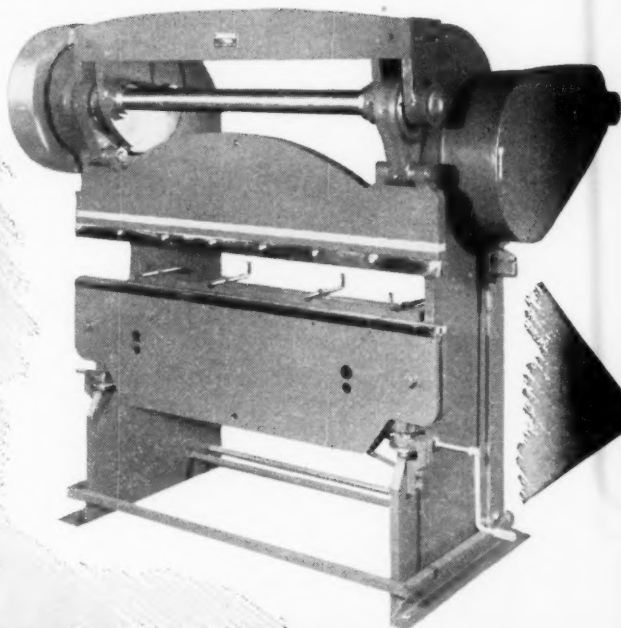
TYPE "300"

STEEL PRESS BRAKE

A Press Brake made to exacting standards and built to take hard and continuous use.

This press will do your work well and efficiently. Dependable service is guaranteed and proven by many years of operation. Variable speed drive for speed and safety.

This is only one of the many fine presses made under the banner CHICAGO. There is a CHICAGO steel press brake to meet your requirements. Your die problems are ours—let us help you.



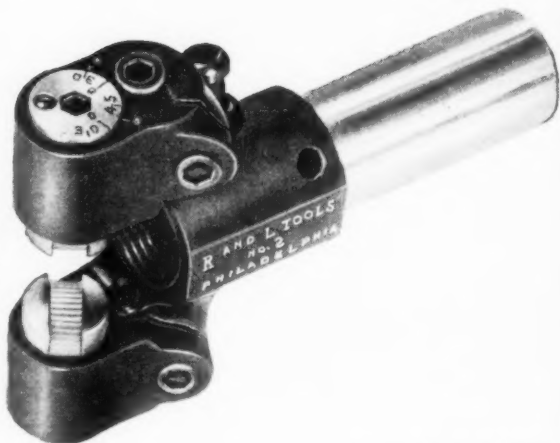
DREIS & KRUMP MANUFACTURING CO.

7440 LOOMIS BLVD. . . CHICAGO 36, ILLINOIS

R AND L TOOLS

NEW! R and L KNURLING TOOL

New streamlined design has half the weight of existing tools of comparable size, affords better grip and controls of knurls. Available in a complete range of sizes. Only one Hex Wrench needed for all adjustments.



R and L FLOATING DRILL HOLDERS

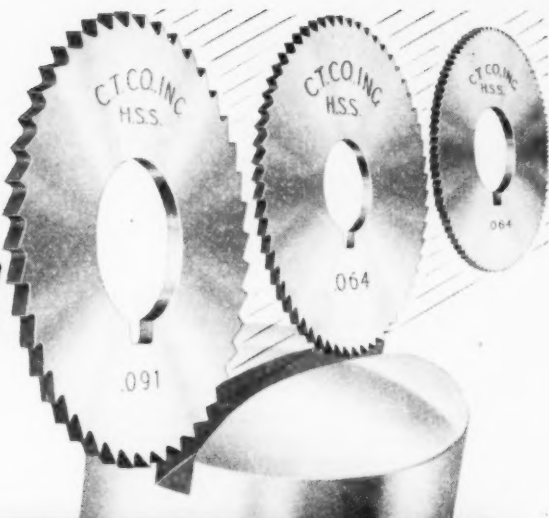
For Holding Drills —
Reamer or other tools
No. 00— $\frac{5}{8}$ " dia. shank
No. 1— $\frac{3}{4}$ " dia. shank
No. 2—1" dia. shank

LARGER SIZES MADE
TO ORDER

WRITE FOR CATALOG

R AND L TOOLS
1825 BRISTOL ST., NICETOWN, PHILADELPHIA 40, PA.

*Right
in the
Groove!*



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featured in this issue

How's Business. A monthly report on significant economic trends as they affect the metalworking industry. Observations are implemented by charts and statistics. With the Korean hostilities the economic situation is in a state of indecision, no one quite knows what's going to happen. In the How's Business department we hope to present latest information on governmental decisions. Page 65

Recent Developments in Metallizing. Three significant advances have been made in art of metallizing in the last several years: 1. discovery of an alloy which bonds itself to the base material; 2. metallizing unit which operates on a smaller volume of air; 3. introduction of a glass flow meter. The changes are discussed in this article. Page 71

New Hydraulically Controlled Diamond Turner for Dressing Wheels. This new diamond turner automatically present a new diamond edge to the work after each pass. Thus clean work is constantly obtained and the diamond is prevented from dulling excessively. Page 79

Increases Production 100% With Oil-Hydraulic Presses. This is a discussion of the installations at the Joslyn Mfg. Co., in Chicago, where these oil-hydraulic presses are really achieving production economies. The installation, tooling and operation of the various installations are described. Page 91

Magnetic Fluid Clutch Offers Simplicity With Efficiency, by Robert E. Goodwin. An analysis of the development, by Jacob Rabinow, of the magnetic fluid clutch principle. The clutch should prove helpful to industry. Page 99

Tooling Up the Job: Should You Buy A Special Machine, by Robert B. Haynes. The works manager of the Spicer Mfg. Co., Div. of Dana Corp. has bought millions of dollars worth of special machine tools in his time. What guides the selection of a special tool? In fact, what questions must you ask yourself before a spe-

cial machine is even considered? How will you know whether or not a battery of standard machines might not be the answer? Mr. Haynes answers these, and other questions, on Page 105

Foremanship Forum: Wage Policies, by Ed. Mottershead. Another in a series on Better Foremanship articles written by one of the Blue Book's steadiest contributors. This month Ed discusses various wage policies as they are in force in modern plants. This article is in two parts. Part 2 will be presented next month. Page 122

Shop Hints. Page 140

Letter from Great Britain, by Robert Hutcheson. Current economic developments in the United Kingdom, written from London by the editor of Machine Shop Magazine. Page 143

Special Report on Knee, Hand, Bench-Type Milling Machines. This is the fourth report in a current series of special reports devoted to the indexing and listing of all machine tools produced in America today. Each report will list the sizes, models and specifications of one particular type of machine tool. In this, the fourth report, knee-type milling machines, begun last month, is concluded. Also featured is a discussion of Hand and Bench milling machines. The article in connection with the current report deals with the subject of Hand Milling. Page 153

Modern Tools in Action. Page 169

Available Literature. Page 175

Appointments and Promotions. Page 186

What's New in Metalworking. Page 191

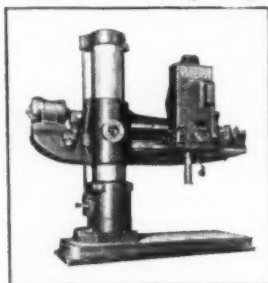
Market Place. Page 252

Literature Mentioned in this Month's Advertisements. Page 254

Mechanics Through the Ages. Page 256

Product Index. Page 258

Index to Advertisers. Page 266



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as the editor sees it

OUR MILITARY MIGHT!

In a recent issue of the Saturday Evening Post, Hanson W. Baldwin, noted military analyst for the New York Times, made some discouraging observations regarding our military strength. He pricks the balloon of American complacency which believes that our weapons are superior to those of other nations.

'Tain't so,' says Mr. Baldwin.

While he establishes some categories in which we are first, he goes on to say that in submarines, tanks and a few other items the Russians are first. In many important classifications our weapons are inferior.

Be this as it may, not being military analysts, nor experts on weapons and the use of same, we have to take Mr. Baldwin's conclusions. He is much too respected an authority to talk balderdash. However, there is one significant observation in the article that should give us food for thought. Mr. Baldwin says the equipment in which we lead the world is that designed and developed by private industry. The equip-

ment in which we are inferior is that designed and developed by governmental personnel.

This observation will not be news to many industrialists, who remember the last war when the caliber governmental personnel was discovered. There is a crying need for government and business to get together for the solution of our common problems. Too often the military have swaggered blithely on their way commanding of industry what it wanted rather than inviting industry's participation.

Our present administration has screamed at business and industry for years. They have investigated, and studied and questioned; they have used smear tactics, and in the words of Ben Fairless, have condemned before the trial. Yet now, when the chips are down we discover that industry-sponsored equipment is superior to the government developed material.

Maybe business isn't such a black-guard, after all!

Must we always be unprepared? Can industry and government never work together for the common good?

William F. Schleicher

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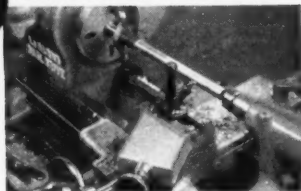
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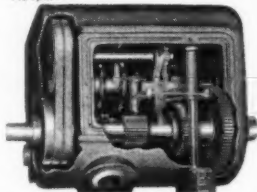
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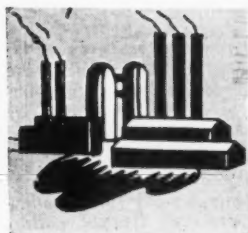
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MACHINE and TOOL BLUE BOOK



How's Business?

Manpower

A few months ago government officials who were worried over the unemployment situation have now begun to be concerned over the shortage of skilled workers. Even before the Korean hostilities began certain areas had exhausted the available skilled workers.

Instead of having critical labor shortage areas, the government is concerned with areas where a scarcity of skilled workers exists. With the Korean war this shortage will become acute in some sections, especially as contracts for war materiel will be let. To date these areas are spotty and concern only a particular type of skilled craftsman; however, other industries may soon be faced by a pinching market.

Rough estimates are that 250,000 officers and men might be needed to fight in Korea. Under present law 550,000 might be called up. Draft, reservists, guardsmen will deplete the labor ranks even further and government officials are watching labor statistics very closely.

The post war peak in unemployment was 4,700,000 last February. Today the unemployment figure stands at slightly more than three million.

The latest job survey by the Department of Labor says, "for the first time in many months, occupational shortages besides the usual hard-to-fill undesirable and low-paying jobs were beginning to appear in a considerable number of areas. Others are expected to develop shortages before too long."

Small Business Act of 1950

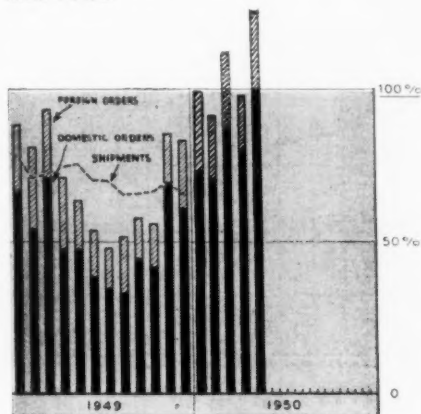
Members of the Senate Banking and Currency Committee continued examining wit-

nesses relative to the Small Business Act. Several proposals were made by Sen. Homer E. Capehart (Rep. Ind.) with which Secretary of Commerce agreed. Proposals consisted of:

1. permit depreciation to be charged off in five years,
2. exempt first \$50,000 of corporate profits from taxation,
3. make it mandatory for the government to place 50% of its procurement with small business.

The S. B. bill would authorize the secretary of commerce to encourage small business loans by banks.

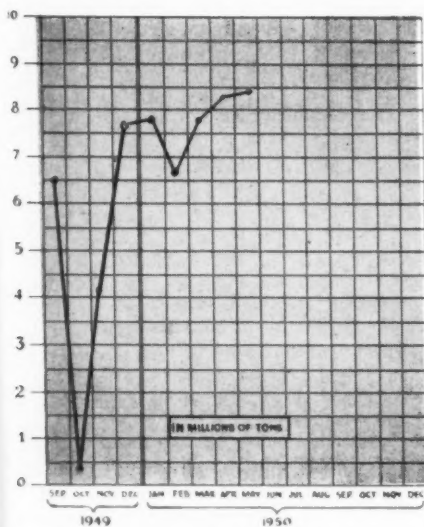
MACHINE TOOL SHIPMENT CHART A quantity comparison between 1949 and 1950



source: National Machine Tool Builders' Association

TOTAL STEEL PRODUCTION

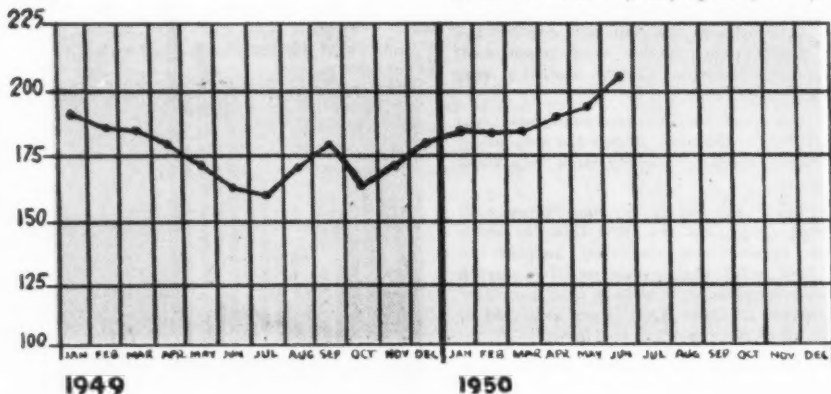
A quantity comparison between 1949 and 1950



source Am. Iron and Steel Institute

TOTAL INDUSTRIAL PRODUCTION INDEX

A comparison between 1949 and 1950



base: 1935-1939 = 100

source: dept. of Commerce

Post-War Competition

In any age when economic forces are world-wide and not isolated in one country, the growing post-war battle for consumers is important. The Germans and the Japanese, as well as some of the satellite countries are entering the world market, in some instances with considerable success.

South Africa recently bought 100 shunting locomotives from Germany. Optical goods, toys, and quality products are causing many a British industrialist lack of sleep. Japanese bicycle manufacturers are concentrating on southeast Asia's market with an \$18 machine which they claim beats the British on quality and price.

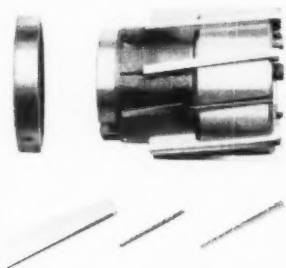
The United Nations Economic Commission for Europe published a list of 129 items of industrial equipment offered by Hungary and 36 items offered by Poland. From Hungary come motors, generators, building and construction equipment and electric steel furnaces.

From Poland come bicycles, machine tools, microscopes, steam locomotives, agricultural equipment and mining equipment.

Prices

Efforts are being made by industry to keep prices in line during these days of war scare and fears of shortages. To date there are no reports of hoarding by industry. Other reports received show no signs of a rush to buy goods or materials which may become critical.

Many purchasing agents are now adding a clause to orders specifying the price quoted



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as the firm price and that the orders will not be affected by any price changes after the date of order.

Nonetheless, prices are pushing up with copper, nickel, and zinc leading the field.

War Orders

A spot check in the Chicago area shows that some orders are dribbling in as a result

of the Korean war. The orders aren't large, amounting to roughly 5-8% of production capacity. Because the plants contacted were already running at near capacity, and have already increased the working week to 45 to 48 hours any large concentration of orders may cause a curtailment of non-war orders. Those machine tool builders whom we queried have received no notices to put "phantom machine tool orders" into effect.

Iron and Steel Controls

President Truman is shortly expected to ask for a "stand-by" law allocating iron and steel and several other key commodities. This is to meet the heavy demand which will be occasioned by the military.

The proposed legislation is now being prepared and it is expected that the law will force mandatory priorities. Government spokesmen said that voluntary allocations did not work when they were tried in previous years.

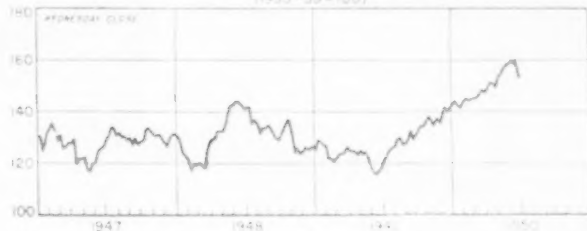
As yet the program is in the planning stage and spokesmen aren't certain they'll have to use the law. They expect the steel companies and other producers to be able to meet the military demands without a mandatory priorities order. However, military experts, while they say the military demands will be "fairly large", have not disclosed exact size of the demands.

Machine Tools

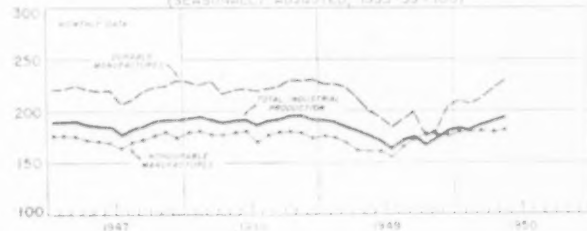
Not since 1946 have machine tool order been as active as they were in May 1950. New orders totaled 115.7 of which 18.3 were foreign. Shipments stood at 82.4 and the ratio of unfilled orders to shipments was 5.2 to 1. These orders do not reflect the buying activity resulting from the Korean situation inasmuch as the tabulation is for

GENERAL BUSINESS INDICATORS

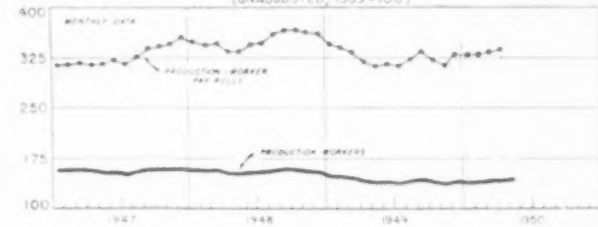
PRICES OF 365 INDUSTRIAL STOCKS
(1935-39=100)



INDUSTRIAL PRODUCTION
(SEASONALLY ADJUSTED, 1935-39=100)



MANUFACTURING EMPLOYMENT AND PAY ROLLS
(UNADJUSTED, 1939=100)



source: Dept. of Commerce



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5. **Pre-Shipping Check-Up** matches your steel against your order's specifications.
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The value of each step has been proven by the experience of other alloy users. And all of these steps are taken for you at no extra cost. So specify and buy Ryerson Certified Alloys. Shipment is immediate.

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Recent developments in metallizing

Three important advances made by this process have greatly aided its development in the last years: 1. discovery of an alloy which bonds itself to the base material; 2. metallizing unit which operates on smaller volume of air; 3. introduction of a glass flow meter.

Three important developments in recent years have taken place in the metallizing process. First in importance is the discovery of an alloy which bonds itself to the base material. This new metal is sprayed with an ordinary metallizing gun. It promises to change very radically the preparation of surfaces for metallizing, particularly mechanical parts. Second is the development of a metallizing unit which operates on a much smaller volume of air than previous units. By eliminating the necessity of a large compressor, the new gun makes the process useful to many more and much smaller companies than before. Third is the introduction of Gas flow meter units for metallizing. Flow meters make possible, for the first time, exact flame adjustment for all sprayed metals. It means higher spraying speeds and lower costs. More important still, it means complete control of coating structure and characteristics.

Self-Bonding Undercoat

Early in 1948, it was discovered that an alloy high in molybdenum can be sprayed directly on smooth steel and many other materials without any surface preparation beyond thorough cleaning. It bonds firmly even to highly polished surfaces provided there is no surface dirt, oil, moisture or other contamination.

The material is sprayed with an ordinary metallizing gun, and is generally used as an undercoat. A thickness of .0015" to .002" is enough to provide an excellent bond for all other sprayed metals. The undercoat bonds well to all common steels, stainless steels up to 12% chrome, monel, nickel and chrome-nickel alloys, cast iron, cast steel, most aluminum alloys and to magnesium. It bonds fairly well to many other materials including glass and ceramics. It will not bond at all well to copper and its alloys, chrome plate or Duriron. However, once applied, any metal including copper and its alloys can be sprayed over it with excellent results.

Figure 1 is interesting as it shows how close the adherence of the undercoat is to the base. The crystalline section is base steel; the white layer is the undercoat, showing actual fusion to the base in many places; the dark section at the top is sprayed .10 carbon steel. Note that there is even closer adhesion between the undercoat and base than between the crystals in the base.

The fact that this material bonds directly to clean, smooth surfaces and provides physical anchorage for other sprayed metals means a considerable reduction in the number of steps necessary to prepare a shaft packing or bearing surface. Take a pump packing sleeve, for example. In the past, the most

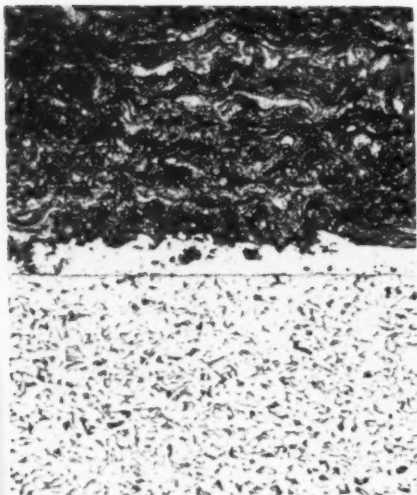


Fig. 1. Close adherence of the undercoat to the base. The crystalline section is base steel; the white layer is the undercoat, showing actual fusion to the base in many places. The dark section at the top is sprayed .10 carbon steel.

highly recommended method of preparation consisted of undercutting the surface, cutting a 14 to 16 square thread, and knurling with a special tool. This provided an excellent bond but the process was slow and tedious. Figure 2 shows a shaft prepared by this method.

Nowadays, a light fast roughing cut and the shaft is ready for the sprayed undercoat. The roughing cut is recommended for three reasons. First, it is the fastest method of cleaning a surface thoroughly, because it removes surface material and exposes clean bright metal. Second, it leaves an irregular surface, thereby increasing the bonding area. Third, it turns the flattened sprayed particles partly on edge, which produces a stronger coating.

In the design of products like pump impeller spindles packing areas can be dimensioned to allow for a roughing cut and the spraying operation. Such a part can very well be made of mild steel and protected, in the packing sections, with sprayed stainless steel or monel.

If roughed out first, then sprayed, all of the final finishing operations can be completed at one time.

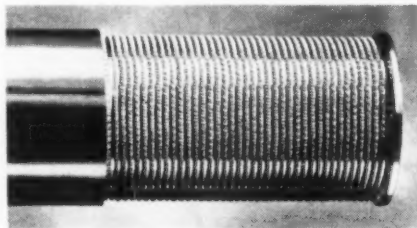
The self-bonding undercoat cannot be used everywhere, of course. On interrupted surfaces, such as a shaft containing a keyway, or a piston with relief areas, the more elaborate threading and knurling method should still be used. Sprayed metals tend to shrink when deposited. Heavy coatings particularly (.050" or more on the radius) place a considerable shear stress on the bond or interface. Again, some metals have higher shrink characteristics in themselves than others. For example, .10 carbon steel shrinks .009" per inch where a medium chrome-medium carbon stainless steel shrinks only .0018" per inch. Heavy coatings of high shrink metals, then, often will impose a very great stress on the bond on interrupted surfaces. Here, threading is desirable as it confines the stresses to the areas between threads; such narrow areas that the stress is no longer dangerous.

For packing and bearing areas, the use of the self-bonding undercoat greatly reduces preparation time. Here, there are no interruptions such as keyways and the coating bonds securely.

The fact that the undercoat bonds well to magnesium and most aluminum alloys is important too. It has been difficult, if not impossible to solder to these materials in the past. By applying the undercoat and a few thousandths of copper, soldering can be done very readily by any of the common methods.

Another possibility that the material

Fig. 2. Preparing a shaft for metallizing by the old method. Recent developments have eliminated a number of the steps formerly deemed essential.



opens up on magnesium and aluminum is the application of hard, wear-resistant surfaces. For example, a shaft can be made of aluminum, for light weight and strength, sprayed with the self-bonding material and then metallized with high carbon or hard stainless steel. There would seem to be all sorts of possibilities for aluminum and magnesium with war-resistant surfaces.

Low Air Gun

At about the same time that the undercoat was discovered and made available, a metallizing unit requiring only 10 cubic feet of compressed air per minute was brought out. Previous units needed 25 to 35 c.f.m. The unit shown in figure 3 spraying stainless steel on a small hydraulic press ram, is not very different in principle from other units. Reduction in air consumption was accomplished by a new turbine design and an entirely new air cap design. In spite of these improved features, a sacrifice in spraying speed was necessary too. The unit sprays 11 B & S gage steels and high melting point metals, $\frac{1}{8}$ " diameter lower melting point materials such as zinc.

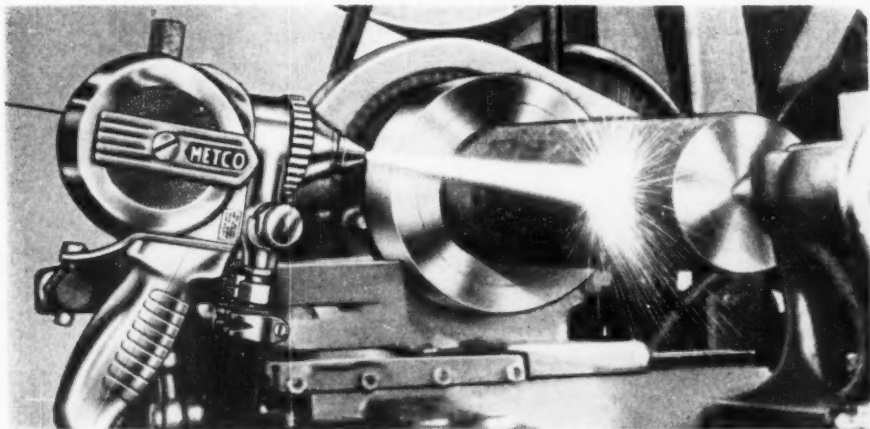
The sacrifice in speed is much more than offset by the reduction in air consumption and the fact that companies

with small compressors can now make use of metallizing. For example, in rebuilding worn motor shafts, such as the fractional horsepower unit shown in figure 4, metallizing gun speed is of little or no importance. Far more important is the ability to repair the worn shaft without removing it from the winding, thereby saving the multitude of operations which removal generally creates. To replace such a worn shaft, the shaft itself must be pressed out of the winding, a new one obtained or made, pressed in and straightened. All too often in these cases, the winding itself is damaged and must be rewound. With metallizing, all of these operations are eliminated.

Speaking of motor shafts, metallizing might be highly advantageous on new shafts which are subjected to abrasive conditions or critical lubrication. Metallizing metals are somewhat porous. They absorb oil and operate with 15% to 25% less friction than ordinary steels and other ordinary metals. For this reason and their particle hardness, sprayed metals are generally much more resistant to wear than the same metals in rolled form.

But to get back to the new low-air gun: it has another advantage which should be quite interesting to industry.

Fig. 3. A new unit, using only 10 cubic feet of compressed air, in contrast to previous units which required 25 to 35 c.f.m., is spraying stainless steel on a small hydraulic press ram.



The cost of a complete installation including compressor is cut in half. The cost of a larger gun with compressor of suitable capacity runs close to \$2000. The low-air gun with compressor costs less than \$1000. This tends to expand the usefulness of metallizing as a process by putting equipment in the price range of companies with a limited use for the process.

Gas Flow Meters

The development of gas flow units for metallizing is even more recent. In some ways, it may be even more important to manufacturers of machinery and other products than the other two developments. Just as heat treating and other processes are carefully controlled, the new ability to control the characteristics of sprayed metal coatings enhances their value greatly. With flow meters, it is possible not only to obtain better coatings, but to duplicate them exactly at any time.

Pressure regulators have always been used with metallizing guns to adjust the gas and oxygen. They provide only a partial control, and even the best regulators do not remain accurate indefinitely. An exact flame setting for a particular metal can only be obtained by controlling the flow of gas and oxygen and the relation of one flow to the other. Flow meters do that.

A unit like the one shown in figure 5 has several other advantages. Exact

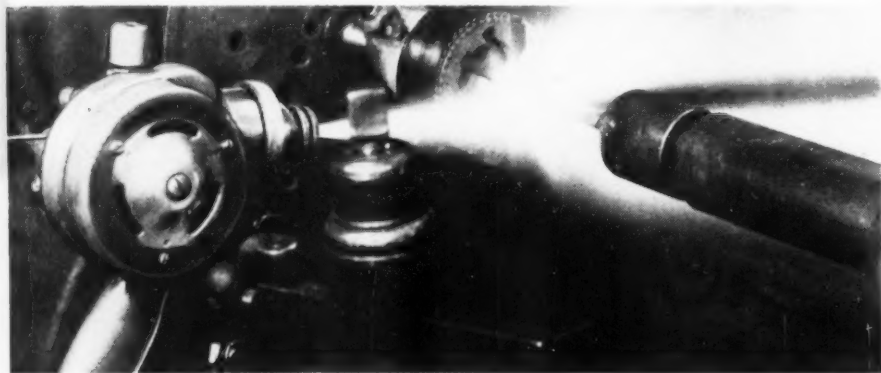
flame settings result in 10% to 20% higher spraying speeds. They also mean greater efficiency in the gun by using less gas and oxygen per pound of metal sprayed. That, of course, is the ultimate goal of all users of metallizing, the lowest cost per pound of metal deposited on the work. Adjusting a flame with Flow meters is much easier too. Their floats can be adjusted from charts provided. Changes are made with the pressure regulators, of course, until the floats are in the desired relation to each other. They're quite visible and even a novice can obtain exact flame settings with them.

Metallizing is being used more and more in the manufacture of electrical equipment. Here, exact settings are of paramount importance in order to obtain uniform electrical characteristics for capacitors, electrical circuits, heating elements and the like. With flow meters, spraying aluminum on fabric for radio capacitors becomes a completely controlled production operation.

Value of Metallizing Greatly Increased

Where the self-bonding undercoat simplifies preparation and reduces metallizing costs, the flow meter units tend to greater speed and efficiency, and what is more important, uniform coatings of predetermined characteristics. The low air gun, on the other hand, makes the process available to a much wider group of companies.

Fig. 4. Rebuilding worn motor shafts by means of metallizing.



These developments seem to promise even more to those machinery and equipment manufacturers who turn to metallizing as a means of making better products or products of equal quality at lower cost. It might be worthwhile to review briefly the advantages of metallizing for such products.

Wear Resistance

Sprayed metals consistently resist wear better than the same materials in more ordinary form. This has been proven again and again on both rebuilt mechanical parts and new parts which have been metallized.

Wear resistance, in the case of metallized surfaces, comes from a combination of two other factors, reduced friction and increased particle hardness. Sprayed steels, carbon or stainless, monel, nickel, bronzes and so on are all porous to some degree. This permits them to absorb and hold fairly large quantities of oil. The pores also provide a means of escape for the tiny particles

of metal invariably dislodged in the wearing process on any lubricated surface. Both contribute to substantially reduced friction.

Laboratory reports of tests conducted on sprayed steel cranks compared with hardened steel crankshafts, both running in white metal bearings, showed that it took far heavier loads to cause the sprayed cranks to seize. When the oil supply was intentionally cut off, sprayed cranks operated more than 20 hours before seizing. Freed, they operated several hours more before seizing again. Hardened cranks, on the other hand, seized in about 3 hours. Freed and re-run, they seized again immediately.

As for hardness, sprayed metals are very misleading. Ordinary hardness tests are of very little value. They measure adhesion of particles within the coating, not particle hardness. Take sprayed .80 carbon steel for example. A coating measured by an ordinary test will show about Rockwell C 30. Particle hardness of the same material, measured by a micro-hardness test, will run close to C 60.

In actual practice, sprayed metals consistently outwear the same metal in rolled form.

Versatility

Of all the processes for applying metal coatings, metallizing is clearly the most versatile. Modern spray guns will spray almost all metals from soft solder, with a very low melting point, up to metals with melting points as high as 4500 degrees F. Through mechanical preparation or the use of the self-bonding undercoat, all of these metals can be applied to almost any type of base material. Hence, with the same tool, it is possible to do a tremendous variety of work, from coating cloth or paper with aluminum, steel with zinc, or magnesium with stainless steel.

Low Heat

Third distinct advantage of metallizing is the low heat involved. Seldom is the temperature of a part being sprayed raised above 200 degrees F. Usually, if desired, it can be kept well below that point. With such low tem-

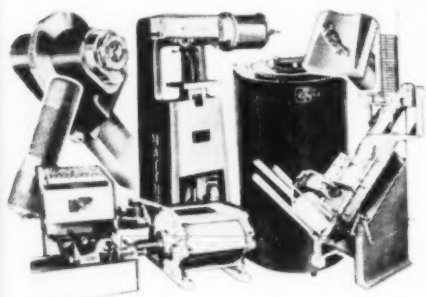
Fig. 5. Flow meters, a recent innovation in metallizing, obtain an exact flame setting for a particular metal by controlling the flow of gas and oxygen and the relation of one flow to the other.



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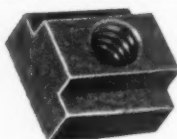
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peratures, no stresses are set up in mechanical parts; no distortion occurs in the build-up operation. Hence, the process can be used to apply coatings safely in many places where excessive heat of other processes would be quite harmful. Some mechanical parts cannot be welded. Some structural parts cannot be hot-dipped. The same metallizing gun can do both jobs successfully and economically with no danger of damage to the part. THE END.

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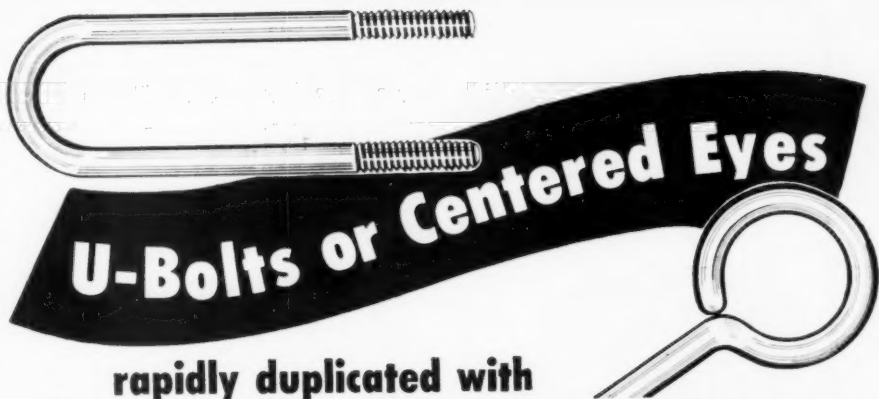


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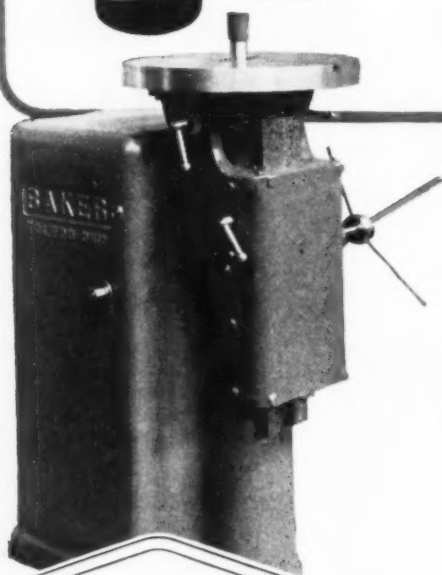
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Capacity, diameter of wheels— $\frac{1}{2}$ " to 4". Capacity, face of wheels—2"—2 $\frac{1}{2}$ "—3". Diameter of table 18". Write for illustrated circular.

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NEW hydraulically controlled diamond turner for dressing wheels

A recently introduced diamond turner automatically presents a new diamond edge to the work after each pass. The turner holds the diamond in place with approximately 275 pounds of pressure. The turner is made out of solid copper due to this metal's excellent heat conductivity.

The development of dressing and truing of grinding wheels has not kept pace with the advancement of the grinding machines, principally because the men in the diamond business who supplied the diamond tools were diamond merchants or importers. The machine manufacturers depend upon the diamond tool manufacturers to make developments in the diamond tools. During the recent war when the diamond tool problems became acute, some of the diamond tool companies acquired engineering departments and a number of new companies sprang up to challenge the development which was so necessary. There have been many developments in recent years, one of the most important being the Solid Copper Diamond Tool.

Since heat is the most disturbing factor to diamonds, Cleveland Industrial Tool Corporation developed the Solid Copper Diamond Tool. Copper, being an excellent conductor of heat is the best metal to use, but because of its softness and elasticity, copper alone is not suitable. By adding other metals, a tool with a tensile strength of 165,000 p. s. i. and a high heat conductivity, with comparatively little elastic drift and a very firm hold on the diamond, was developed. This affords the dia-

mond longer life through cooler operations. Realizing that there was further need for cooler operation of the diamond and by studying the reasons why diamonds failed, the Cleveland firm found that in most cases it was because the diamonds were forced to work under adverse conditions. The operators cannot always be blamed for these conditions. In many cases, they are found to compromise using a diamond that is dull with a coarser wheel to obtain the desired finish.

This practice is very destructive to the diamond because the larger area of the diamond in contact with the wheel causes more heat to be absorbed by the diamond and the diamond tool. If a fine grain wheel is used, it is necessary to have a sharp diamond which will dress a fine grain wheel, because if the wheel is dressed with a dull diamond, it will not cut freely and only a fraction of the pieces will be obtained between dressings. In the opposite extreme, where a rough wheel is being dressed, it is still necessary to keep only a small edge of the diamond in contact with the wheel. In most cases, when the diamond has a flat worn on its cutting edge, it will wear before it reaches across the face of the wheel. This condition is caused by the extreme heat

10

ways to keep a tight rein on

The variety of precision-built products shown here is representative of 10 different types of cost-saving small tools and equipment manufactured in complete ranges by Brown & Sharpe.

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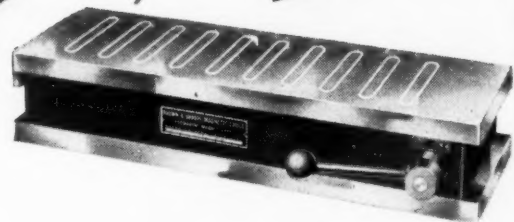
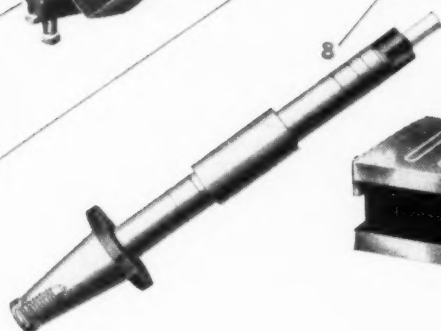
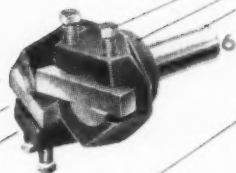
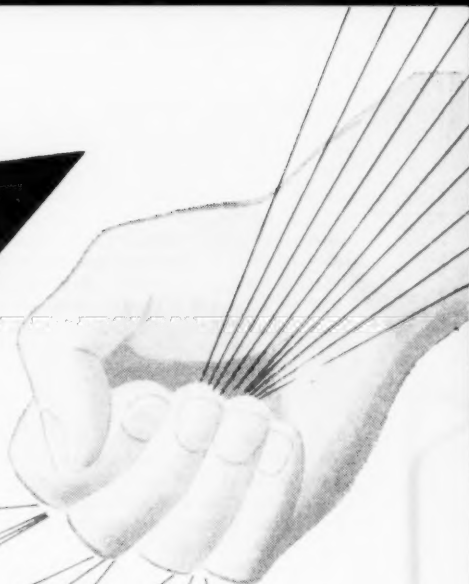
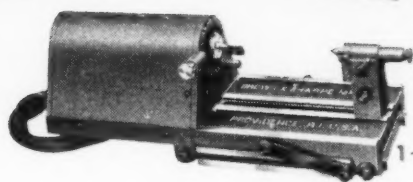
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the diamond is subjected to and pressure to break away the particles of abrasions from the wheel.

It is no longer believed that it is necessary to use large stones on large wheels. A 1½-carat diamond will dress almost any size wheel if the conditions under which it is being used are favorable. To make conditions favorable, it is necessary that the diamond remain sharp. By manual attention, it is not practical for the machine operator to turn his diamond every time he dresses his wheel, even when he turns the diamond he may set it at another dull point and in many cases a good diamond is sent out to be reset because the operator would not find a suitable edge on the diamond to dress his wheel. Also, if he is working with a glazed instead of a fine grain wheel for finish, if he turns the diamond he may bring up a sharp edge which will dress the wheel to grind true to its grit and thereby, he will not have his finish. The recently developed Citco Hydraulic Automatic Diamond Turner overcomes these problems. By controlled Diamond

Turning, the diamond saving is stated to be well over 50%. The most important results show up in the operation of the machine. In cases where a form is being dressed into the wheel, steps not over 1/32" deep, radius of angles, the Hydraulic Diamond Turner maintains the same point of contact with the wheel, diamond and cam, therefore, it does not become necessary to adjust the cam throughout the life of the diamond. Finish and pieces between dressing remain consistent. On very fine finishes by turning only 3°, it is possible to maintain a very sharp diamond, which is less than .002" at its widest contact with the wheel. A wheel of fine grit should be used as the diamond remains consistently sharp; a microfinish can be obtained without skillful dressing very easily and can be maintained throughout the life of the diamond. A fine wheel when dressed properly will grind cooler and produce more pieces per dress. Often it is necessary to hold very close sizes. As temperature changes sizes of the work pieces, it is desirable to maintain as cool grinding as



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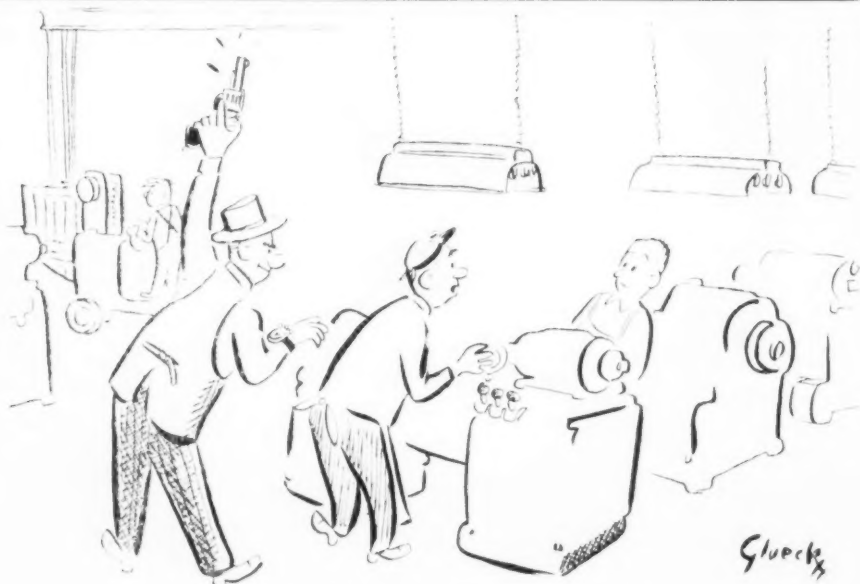
THE
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possible. In operations where the finish is obtained by glazing the wheel, a large amount of coolant is necessary. This adds to the chances of scratches or pits in the finish of the workpiece. Therefore, the best method for finishing is to use a fine grit wheel and a sharp diamond. In grinding operations where it is necessary to rough grind, it is necessary that a large diamond be used, because without the Hydraulic Diamond Turner, the diamond is required to absorb more heat than a small diamond can withstand.

The abrasive action of the grinding wheel on the diamond never causes excessive wear, except when the diamond is in a heated stage, since diamonds are much harder than the grinding wheels. When the grinding wheel has heat pressure and steel particles, welded into itself, it becomes very hard for a dull diamond to resist the abrasion because the diamond operates at high temperatures. If the diamond remains cool and sharp as with the Hy-

draulic Diamond Turner, it is unnecessary to use large diamonds. One-half carat diamonds are suitable for fine finishing work on wheels of practically all widths and on regular grinding operations with a wheel up to 4" of face width. The average operation which uses wheels of 6 to 8" of face width, a $\frac{3}{4}$ carat diamond is large enough. It may be believed by most operators who are now using 2 to 5 carat diamonds on many 8" wheels, that a $\frac{3}{4}$ carat diamond will fail on the third or fourth pass. There are some very rough grinding operations on which it is necessary to grind heavily. The wheel has steel welded into itself, which has to be removed by the diamond. On these jobs, operators use very large diamonds, usually 3 to 10 carats. The reason such a large diamond is necessary is because there is a lot more heat and pressure that the diamond has to absorb,—not only breaking away the wheel particles but cutting out the steel that has been welded into the wheel. If this is expected to be accomplished with a large



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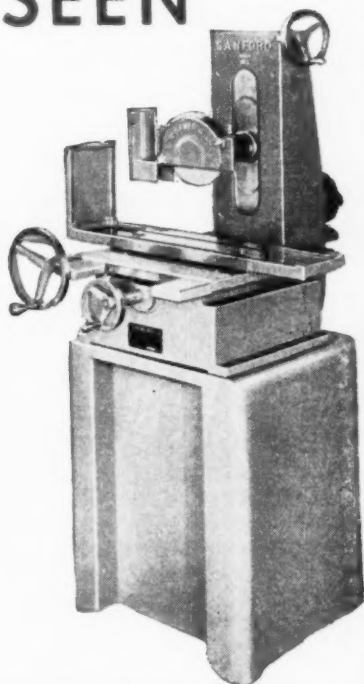
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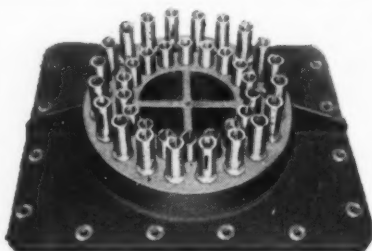
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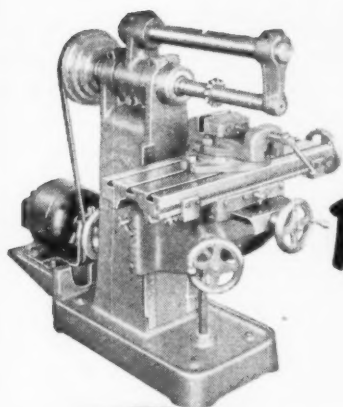
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flat section of the diamond, it can be seen how hard it is for the diamond to accomplish this multiple job. By turning a diamond of 1 to 1½ carats hydraulically 10½°, this dressing can be done very easily, and without trouble of excessive diamond wear which causes the wheel to be dressed as a taper. Form dressing jobs make diamond wear a headache for the operators because they have to shift their cam as the diamond wear moves the form. This condition is also overcome by the hydraulic turning method. This is the only positive method known today. The diamond must be mounted solidly into the tool holder, but if the diamond tool holder is not solid, the diamond being harder and more brittle, with more definite cleavage grains than carbide, it is impossible for the diamond to do its job. The Hydraulic Diamond Turner holds the diamond during the dressing operation with approx. 275 pounds of hydraulic pressure. There can be no vibration present. Wear on the turning unit must also be considered,—the Hydraulic Turner cannot be reached by abrasives from the wheel.

Many a good diamond has been ruined by taking only one pass and not turning the diamond immediately. One pass of .010" or .025" with a sharp diamond generally does not hurt, but a second pass with the diamond in the same position generally causes a great deal of damage to the diamond. Tests have been made with a one carat diamond in the solid copper shank and have been dressed .100 in one pass with a sharp diamond on 8" of wheel, with the only damage to this diamond being excessive wear. The second dress across in the same position, the diamond shattered. A test of the amount of wear of the diamond has also been made. Generally, wear can be attributed to the amount dressed off the wheel per pass. This is because the more that is dressed off per pass, the higher temperature and pressure the diamond has to do its work under. By taking under .0015" per pass, the life of the diamond can be greatly increased. When more pieces are obtained with the hydraulic turning method, there is also a saving in wheels and man hours,—problems that are very important today. **THE END.**

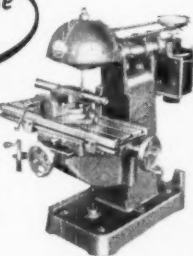


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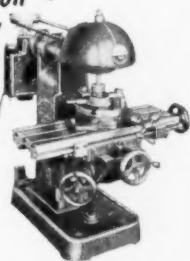
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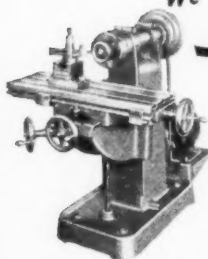


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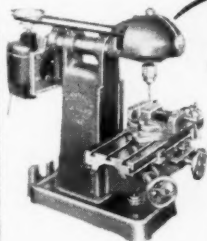


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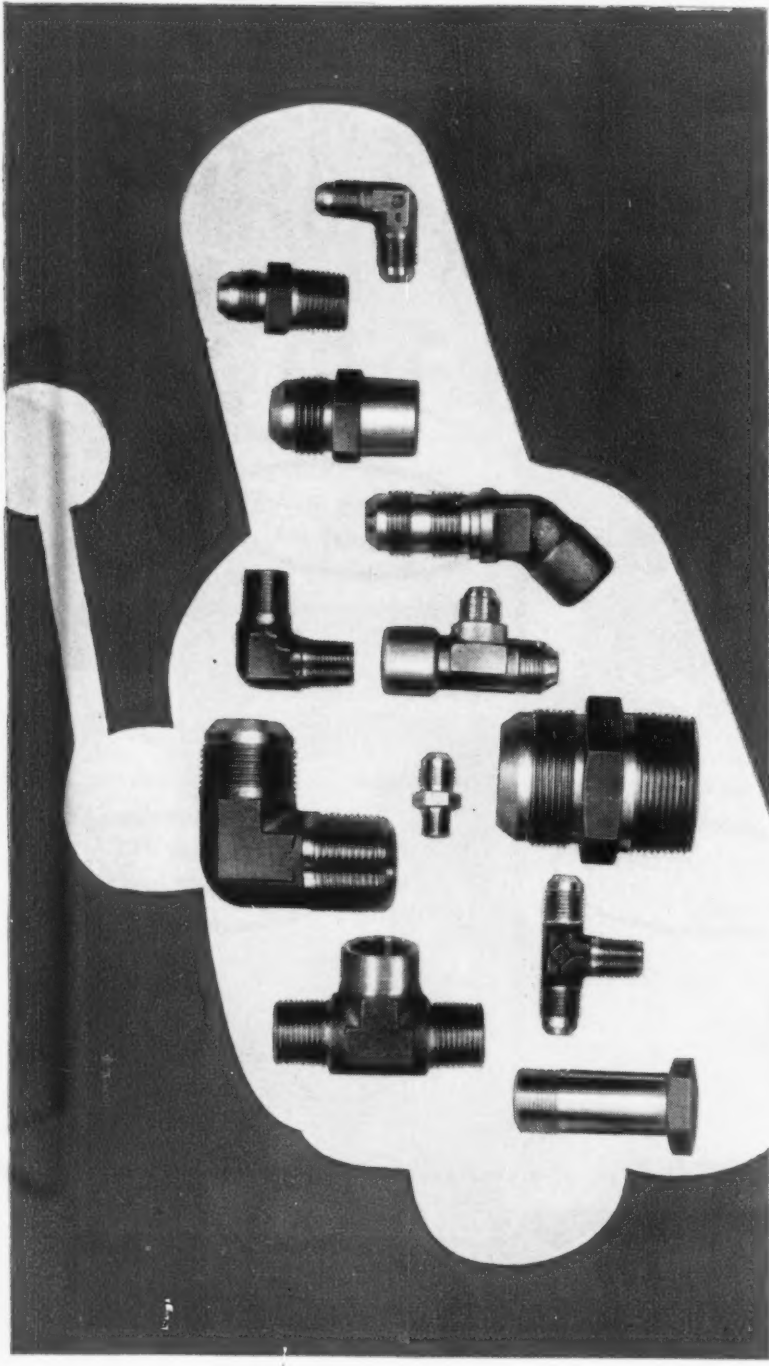
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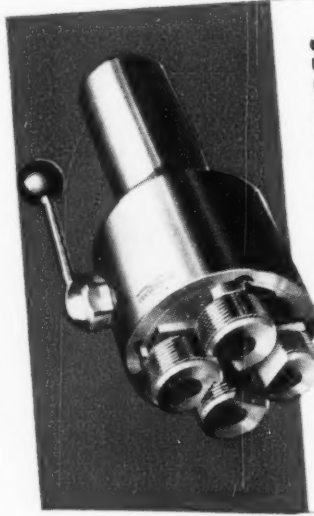
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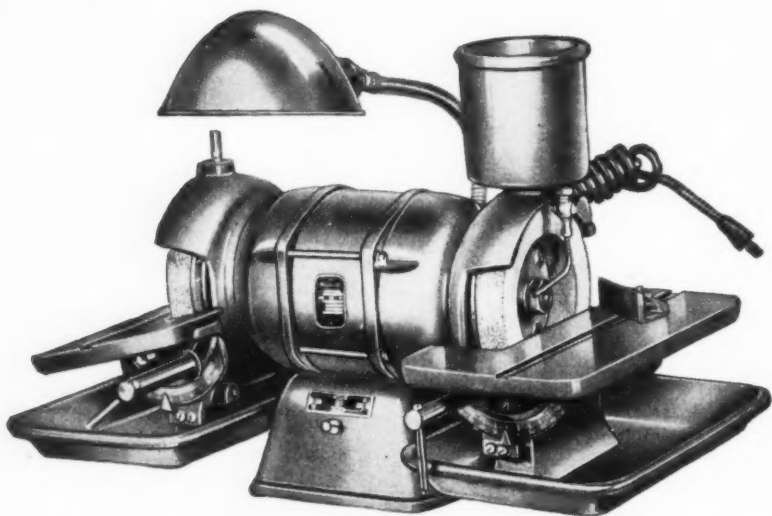
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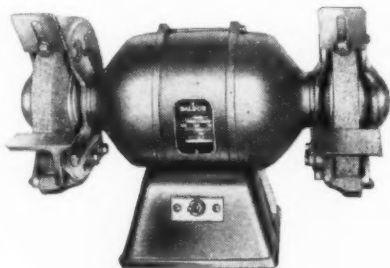
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The Joslyn Mfg. Co., Chicago, reports substantial production increases on assembly operations. On one operation production is stepped-up 100% through the ingenious use of a six-station indexing table. Table automatically ejects assembled parts.

The Joslyn Manufacturing Company and its Equipment Division in Chicago, makers of high-voltage equipment for cable and electrical installations, report major increases in the production of many parts and assemblies. Using automatic, oil-hydraulic presses, the firm increased output over 100 per cent on one assembly operation and gained sizable boosts on others.

The specific job that is handled with more than double the former output is the assembling of a square-shank bolt to an insulator holder. These are being accurately and safely assembled at the rate of 1500 per hour on a 25-ton capacity Multipress equipped with a six-station index table. This equipment is made by The Denison Engineering Company of Columbus, Ohio.

Each of the six stations on the table is tooled to hold the two parts that make up the assembly. The operator loads the parts into the fixtures at front of the index table, and the Multipress automatically indexes parts to

the ram pressing station. As the table rotates, the assembled parts are loosened and ejected into an off-bearing chute, figure 1.

Bins holding the two parts are within easy reach of the operator, who inserts the bolt in the insulator base and then slips both into the holders. Actual pressing is done under present control at the third index station beyond the operator. This is more than an arm's length away and eliminates danger to the operator, although the press is in continuous operation. The ram exerts a 20-ton effort to assemble the parts. Press ram and index table actions are positively synchronized.

Assembled parts are automatically ejected from the table fixtures by means of a cam within the index table housing. This cam is beneath the station immediately beyond the pressing position. As each assembly arrives over the rising surface of the cam, it is loosened in the holder, ready for final ejection. A lever under the next station is coupled to the press ram. When the ram descends, the lever goes up and strikes the bolt end of the unit. The jolt literally "jumps" the assembly out of the fixture and topples it down a chute into a tote pan. This action clears the holder for the next cycle of operation, figure 2.

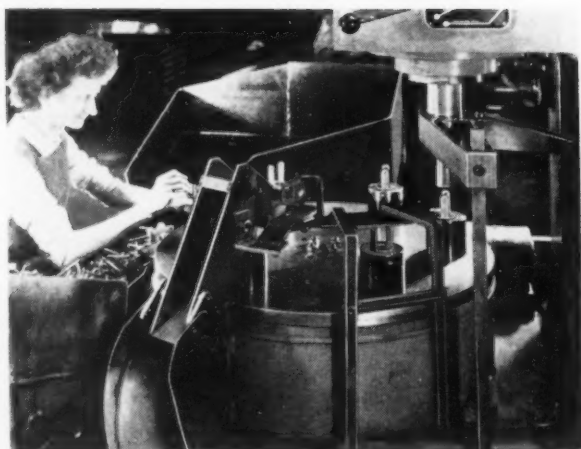


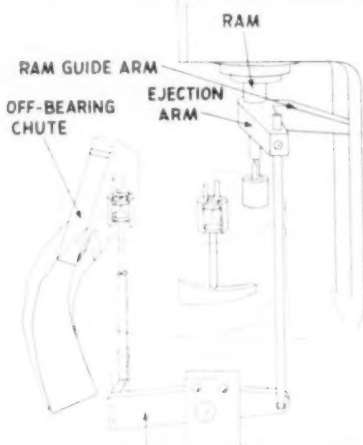
Fig. 1. Operator loads a square-shank bolt and an insulator holder into each fixture as it rotates to front of the six-station index table on this 25-ton Denison Multipress. Parts are automatically positioned under the ram, assembled, and ejected at the rate of 1500 per hour.

A counting device is bolted to the ejection tooling. This is located so that the insulator part of each assembly trips an arm of the counter during movement to the ejection point.

This same type of tooling had already proved its efficiency at the Joslyn plant on an 8-ton Multipress. It was used in assembling a similar insu-

lator base in which two bolts were inserted. Production on this application had reached 900 per hour, representing a considerable gain over the previous method. In planning to adapt assembly of the single-bolt unit to another Multipress, it was found that a 25-ton model would increase production even more. This is because it permits higher indexing-table speeds. The 1950 per hour rate of the single-bolt units consequently is 66 per cent faster than the two-bolt assembly.

Fig. 2 Diagrammatic sketch of the mechanism that automatically ejects completed bolt and insulator holder assemblies. It is actuated by rotation of the index table.



RAM-ACTIVATED LEVER EJECTS FINISHED PARTS

When a mechanical press, operated through a single cycle, was formerly used on this assembly job, many more manual operations were necessary. The operator preassembled the parts and placed the assembly in a specially designed fixture, much the same as with the oil-hydraulic press. However, succeeding operations were manual. The fixture had to be pushed into pressing position by hand, and the ram was actuated by a footpedal. Then the assembled parts were manually withdrawn and ejected from the fixture. In this setup, danger to the operator was everpresent. The production rate was only 700 per hour.

Another operation that utilizes a well-engineered setup adapted to Multipress is in the Joslyn Equipment Division. This is in assembling two parts used as a subassembly in lightning arrestors. The parts consist of a bottom

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struments designed for the purpose, at present, for general use, the most practicable method available for determining roughness is the use of calibrated surface roughness comparator blocks or specimens.

actual surface form of relative larities, such as polished surfaces or abrasive grain. 2.6 Surface between the constitute the

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"This standard is mandatory for use effective 2 January 1950 by the Departments of the Army, the Navy and the Air Force. Deviations from this standard will be permissible only by authority of the Munitions Board Standards Agency."

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Fig. 3. In this operation, the Multipress ram presses a small stud into a larger fitting to produce a subassembly for lightning arrestors. Assemblies are completed at the rate of 550-600 per hour. Note that the operator's hands are safely pressing the dual control levers when the ram is in motion.

fitting and an insert, or bottom stud. These are placed handily at the right and front of the press equipment. The large bottom fitting is placed on the holding fixture which is fastened to the bed of the press itself. The smaller unit is then inserted in this fitting. To actuate the press ram, the operator ap-

plies slight pressure to both of the lever controls, which keeps both hands occupied when the ram is in motion. This prevents the operator's hands from being within injury range of the moving ram. Action of the ram presses the insert tightly into the larger fitting. Preset pressure control assures uniform seating of the small stud and a reduction in assembly rejects. Assemblies are completed at the rate of 550-600 per hour, figure 3.

A third application by this firm is in the production of a subassembly used in large street lighting units. This press is located alongside the other one, and tooling for the two presses is interchangeable. It can be quickly and easily switched if production scheduling makes this necessary.

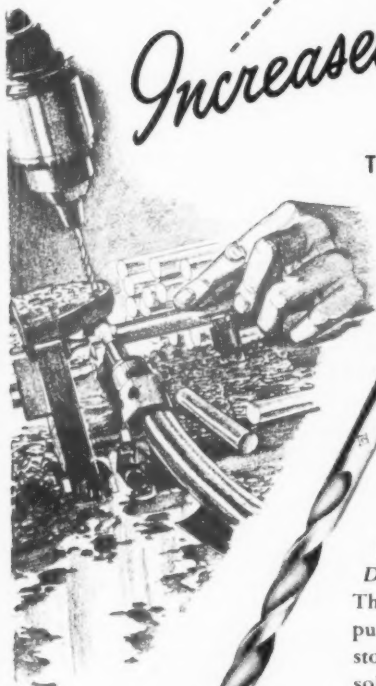
The two elements being assembled in this operation are a screw-machine part and a lightning arrestor base, which is a small cap or cover with a threaded center hole. To attain the highest production speed on this job, two operators are employed. One inserts the screw-machine part in the center of the bottom cap and hands the assembly to the press operator. The latter checks position of the threaded part on a depth gage conveniently located on the holding fixture fastened to the press bed. The press operator adjusts the assembly as required. This checking and adjusting by the operator balances work between both of them and eliminates wasted time, figure 4.

Fig. 4. A screw machine part and a lightning arrestor base are being assembled. The ram stakes the threaded insert permanently in position with 7-ton pressure. Preset pressure control assures accurate assemblies and reduces scrap losses.



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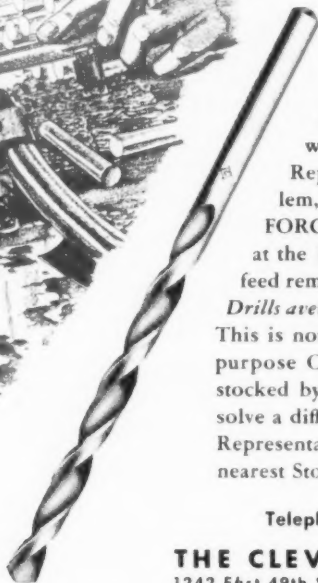
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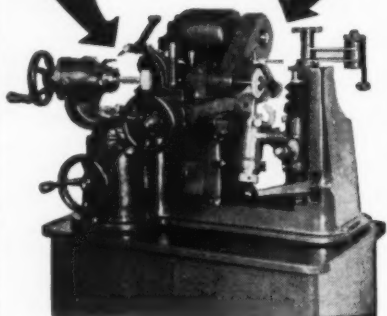
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Because tonnages are accurately preset, operation of the ram is again a matter of dual hand control, with minimum fatigue. The ram stakes the threaded insert permanently in position with 7-ton pressure. As in the previously described setup, preset pressure control is most important. It eliminates cracking the cap assembly and reduces scrap losses.

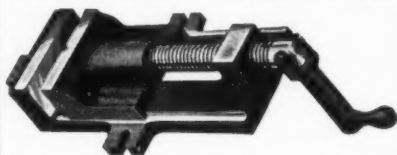
With the operators seated comfortably in front of these Multipress, fatigue is materially reduced. This is a costly factor often present in many similar types of operations with equipment requiring greater manual effort.

The End.

Dr. James T. Eaton has been named director of research of E. F. Houghton & Co., Philadelphia, in full charge of the company's research and control department.

Appointment of Karl Kesselring as general factory manager and Gordon G. Lohmiller as planning manager of SKF Industries, Inc., Philadelphia, has been announced.

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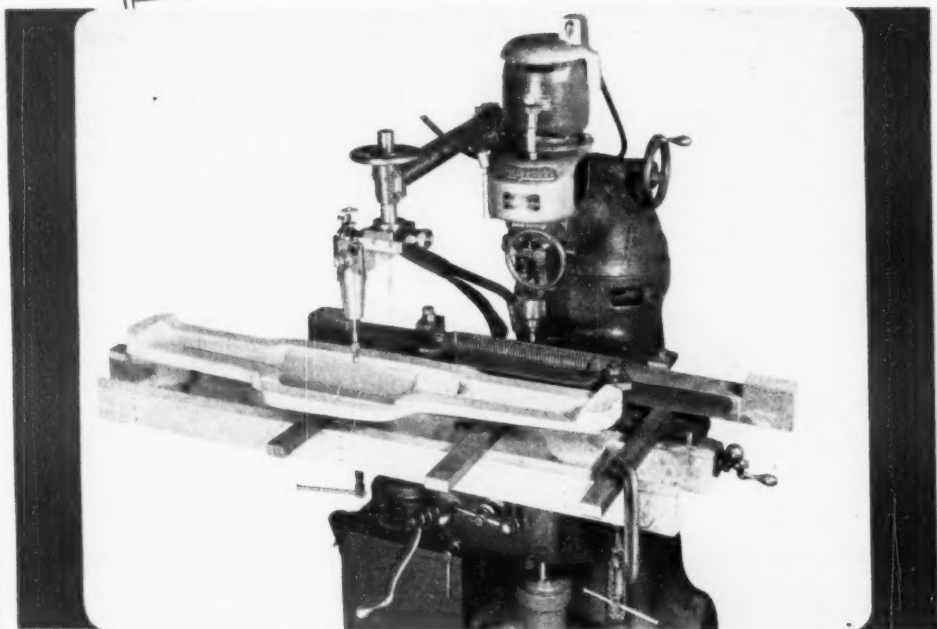
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Magnetic Fluid Clutch

Offers Simplicity With Efficiency

THE characteristics of a new magnetic clutch include high efficiency, smooth operation, simplicity of construction, long life and the use of small amounts of electric power to control its operation. Obviously, such characteristics permit the clutch to have extensive applications in control of machinery, automobiles, servo mechanisms and many other fields where ease of control and stability from low to high speeds are important factors.

This new concept of clutches operates on the basic principle that when space between two parallel magnetic surfaces is filled with magnetic particles and a magnetic field is established between these two plates, the magnetic particles bind the two plates together against

By R. E. Goodwin

While developing electronic computers for the Department of the Army, Jacob Rabinow, Chief of the Ordnance Mechanics Section, National Bureau of Standards, discovered a new utilization for one of the basic principles of magnetic attraction. This discovery, which at the present is under further development and testing, should lead to greater efficiency in the design of clutches for automotive and other mechanical uses.

movement parallel to their surfaces. This effect of binding two plates together by some intermediate media, is in itself the principle of the clutch as we know it. Figure 1 shows this magnetic force in its simplest form.

The magnetic clutch is basically the combination of three elements: a driving shaft with a plate on its end; a driven shaft with a similar plate; and fine iron particles, suspended in oil, positioned between the two plates. Added to these basic parts would be an electrical source of power to actuate the iron particles and materials for housing the components.

The gripping force of the iron particle depends upon the amount of current passing through the clutch. The minimum driving force would be the viscous drag of the oil between the two plates, while the maximum force would be the magnetic saturation of the iron particles. Unlike other electromagnetic clutches which follow a square law by which the torque is proportional to the square of the electrical current, torque in the new clutch is proportional to the



Fig. 1. A fluid mixture of fine iron powder and oil "solidifies" and adheres to the surfaces of the magnet. This principle creates a form of clutch when the space between a driving and a driven plate is filled with magnetic particles. When an electrical field is set up between these plates, the magnetic particles "solidify" and transmit power from the driving plate to the driven plate as though it were one solid unit.

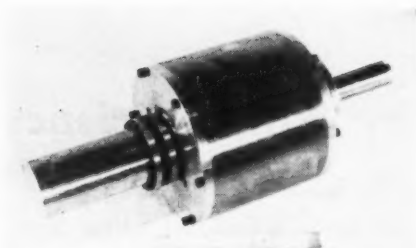


Fig. 2. An experimental model of the magnetic fluid clutch. Only 6½" long, the clutch is capable of transmitting 40 h.p. at 3000 r.p.m. This type is well suited for machinery and automobiles.

• • •

current over a wide range of torque values. Thus, a smooth action is obtained from minimum to maximum application of power. Chattering, as we know it in the present dry friction clutch, is not a factor in the magnetic clutch. The locking force is comparatively constant, and the bond between

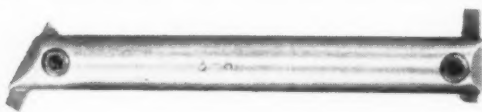
the two plates is determined by the increase of the magnetic field . . . there is no point at which the clutch suddenly tightens to jerk or chatter.

As all the surfaces of the arc are smooth and bathed in oil, there is no appreciable wear. What wearing of the metal surfaces would result from usage would only add to the amount of magnetic particles.

Because of the lack of axially moving parts, the clutch is relatively easy to construct, light of weight and small of size. In figure 2, a magnetic fluid clutch, suitable for use with machinery and automobiles, is shown which will transmit 40 h.p. at 3000 r.p.m. It is only 6½" long and 6" in diameter. In figure 3, an exploded view of the same model reveals the simplicity of construction and the few parts needed.

Controllability and the small amount of electrical power needed makes the clutch applicable to use in machinery and automobiles. It is a relatively simple matter to coordinate the electrical controlling circuit with throttle

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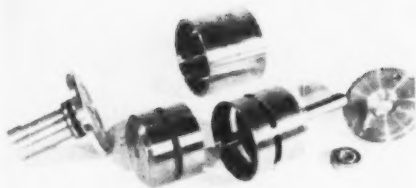


Fig. 3 An exploded view of the clutch shown in fig. 2. Note the few simple parts required.

• • •

settings, speeds and power outputs for automatic use.

However, Mr. Rabinow expects that the unit will find even more extensive application in servo mechanisms for actuating mechanical equipment. Such servo mechanisms are used for steering of trucks, planes, ships and tanks. Other servo mechanisms would be used on brakes, power machinery, and all forms of military equipment.

The clutch can also be applied to tools utilizing overload devices, such as in tapping, screwing and drilling tools.

The clutch, while still largely in the experimental stage to determine its adaptability to numerous applications, has aroused a considerable amount of interest by industrial and governmental officials, who have been allowed to inspect working models. Patent applications for the invention have been filed, and the inventor has assigned all rights to the government.

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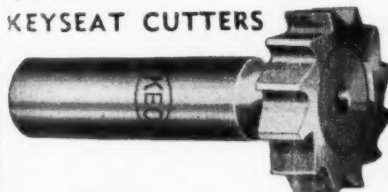


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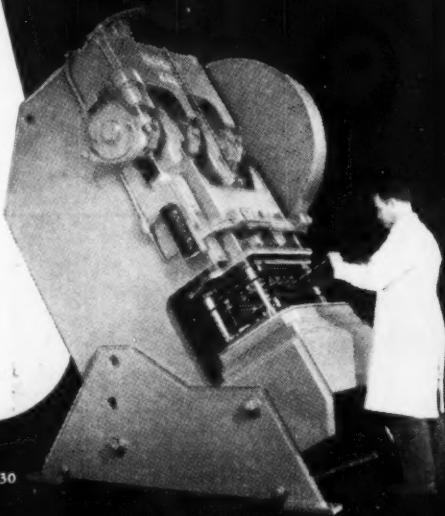
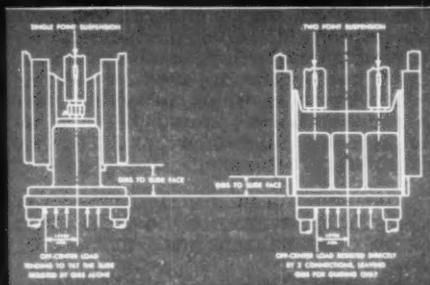
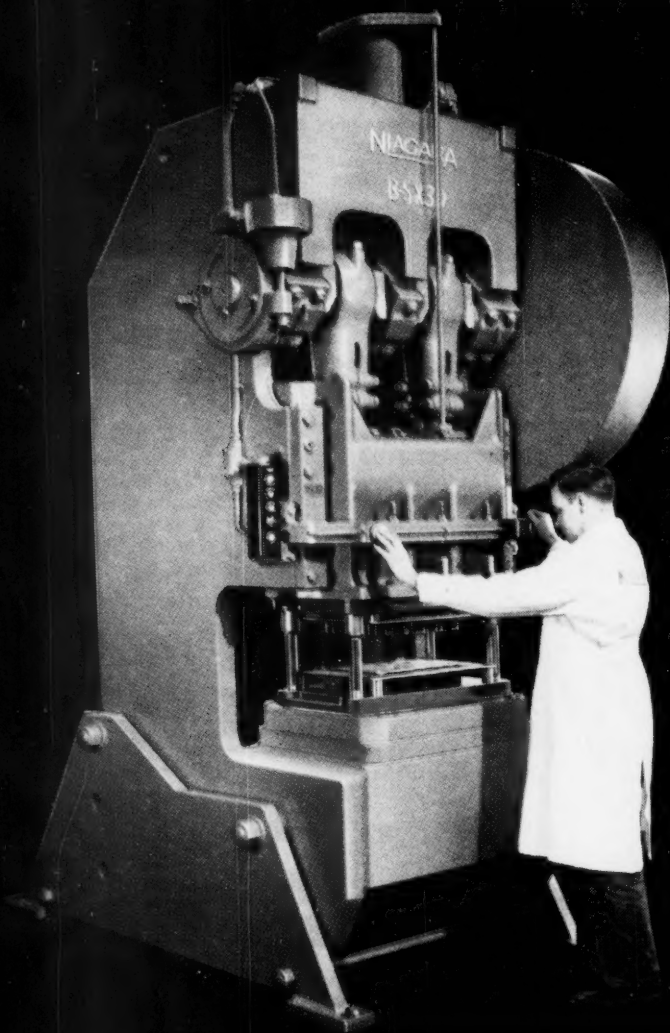


Illustration shows Niagara No. BI-5x30 press in inclined position.

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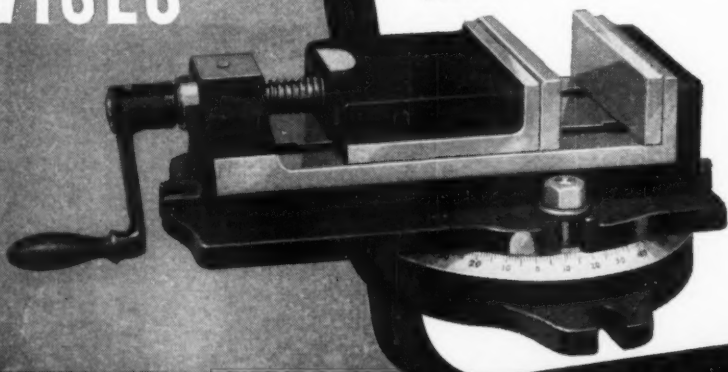
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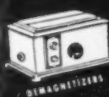
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Tooling up the job:

by Robert B. Haynes,



Works Mgr., Spicer Mfg. Co., Div. of Dana Corp., Toledo, O.

- should you buy a special machine?

What are some of the guide posts which can be used to determine whether a special machine should be purchased? How are cost estimates made? How is special machine selection made?

The cost of a special machine as against the cost of a standard machine is never a safe determining factor in machine selection. It's better to ask, what important benefits will accrue as a result of spending the additional money for a special machine?

First, we must define the job that is to be toolled.

It is not enough to define it as a six cylinder L-head engine; nor enough to fix the production at 500 units per day; and the definition is far from complete when we set the length of the day at 16 hours.

We must also know who is going to use the tools. There is an enormous difference between tooling a job for a group of experienced operators and foremen in a long-established plant and tooling the same job for a new plant with new employees and new foremen.

These are only a few of several things we ought to know in addition to quantity per day and description of the product before we can properly approach the matter of tooling up the job. I shall, therefore, make little attempt to be specific in these remarks and shall content myself with generalities against which most jobs can be measured.

Preparing an Estimate

The first step, no matter what the job, is the preparation of an estimate. This should be done whether the tool-

ing is only for a single operation which has been brought about by an engineering change or for an entirely new product. The estimate commonly takes at least two of three forms. The business of estimating in detail the cost of all that is necessary to produce a large transmission is a long project. It is not often a customer or a sales department is content to await the outcome of such a meticulous survey. Information on investment required must be forthcoming more rapidly. As a result the initial estimate is either picking a figure from the air, or a so-called quick scanning of the proposed job. In either case it is always followed by an accurate detailed analysis which sets forth the final figures within which the tool division must function.

Picking a figure from the air is not so preposterous as it may sound. A man with a reasonably good memory and a lengthy experience in a given type of product will come surprisingly close to the actual cost of providing the tools and equipment to place a new design of that product in production. A heavy duty transmission will usually exceed \$100,000. in jigs, fixtures, and gauges. A new design of torque converter may

run over twice as much. If floor space and machinery are necessary the total amount of money required begins to mount rapidly to large figures.

Most of such picking a figure from the air is done from an outline drawing of the product and seldom occupies over half an hour of time. In the course of a year probably one fourth of all our tooling programs are based on this sort of an estimate. In the aggregate this will add up to between a quarter and three quarters of a million dollars a year for us.

The quick scanning procedure is, of course, more accurate than the gesture of picking a figure from the air. It consists in the first place of having a reasonably complete assembly drawing of the product from which to work. It proceeds to a semi-detailed count of the operations required. I mean count, not a write-up of operations. It continues to a multiplication of a rule-of-thumb figure for tools per operation by the number of operations. Here again the cost of floor space and other equipment is added and the total is considerably more accurate than that obtained by the picking from the air. Even floor space requirements are determined by the number of operations multiplied by a constant number of square feet per operation. The constant, naturally, varies with the product.

This quick scanning type of estimate can be completed in a few days at most and in our business accounts for half or more of our total estimating. This adds up to one and one-half million dollars of tooling per year.

In any event and although in some cases a new product may go through both types of estimates just described all jobs wind up with a formal detailed estimate from detailed engineering prints. It is from this last careful analysis that all designs and purchases are made.

Where machine tools or other equipment are necessary the general type to be used is determined in the course of preparing this final estimate. The determination of the type of machine tool to be used is the result of two separate and distinct sets of facts although each may have some influence

on the other. The first phase of this determination is concerning with arriving at a decision as to what the machine should do. The second phase is for the purpose of deciding who shall build the machine.

The Functions of the Machine

Deciding what the machine should do requires a marshalling of a great many facts some of which have little connection with the new job being toolled. Leaving aside the basic assumption that if the machine is intended to drill a hole it must have a means for holding a drill. Some of the other questions to be resolved are:

1. What are the restrictions and limitations on holding the part while the operation is being performed?

The answer to this question is a very weighty factor in making a final decision on what the machine should do. With some parts on some operations the part may be held in such a manner that clamps and locating devices will not interfere with tool spindles and operations may be performed in several planes at the same time or in consecutive sequence. In other cases the necessities of holding the part may absolutely prohibit the performance of more than one operation at a time.

Example: Trans. Case

- (a) Drill and Tap
- (b) Top mill

By resolving this first question we may in some cases immediately eliminate the need for answering some of the remaining problems since, if it is impossible to perform more than one operation it is unnecessary to worry about the effects of trying to combine operations. Nevertheless, there will always be many circumstances in which a decision must be made on the next question, which is:

2. Shall operations be combined so more than one may be performed at one loading of the part?

Obviously, at this point we run into a maze of very serious proportions. In the first place the quantity of parts to be produced in a unit of time is all-important. It is not enough, however, to include in the consideration only the quantity of the new part for which the

machine is to be purchased. Before any sound conclusion can be reached it is also necessary to scan parts already in production which are similar to the new part and which might profitably be subjected to the proposed combining of operations. It is further necessary to weigh potential future parts which may be processed over the equipment under consideration. Such combining of the beaches for parts which will help build up the initial quantity requirements will probably make it necessary to revise the original concepts of the machine tool in the direction of adjustability and greater flexibility but it may well be worth it.

Example: Axle tube drilling on Kingsbury 7 spindle for new Studebaker, also used for tubes with only 3 drillings.

Obviously also, in any consideration of combining operations, the question of loading time and transfer time as compared with machine cycle time is of large importance. There a part can be loaded, unloaded, and transferred in

a few hundredths of a minute and machine cycle time is a matter of several minutes there may be serious doubt as to the value of combination operations except in cases of exceptionally large quantities. On the other hand if loading, unloading and transfer time add up to an hour and the machine cycle is only one minute the pressure to combine operations becomes terrific.

Example: Atcheson Topeka and Santa Fe set-up on top hole drill, chamfer tap and ream on Trans. cases.

Not the least of the factors pertinent to the question of combining operations is the matter of quality. Very frequently two or more holes or surfaces have to be machined in such accurate relationship to each other that any attempt to produce them in separate operations with separate loadings of the part is doomed to disaster. In these instances operation combination is almost mandatory.

Example: 2 Case and Cover build-up on Torque Converter with dowel and shift rod holes.



"I told ya. to operate this thing ya gotta stand in a hole."

Finally, before we can decide whether to combine operations or not, it is essential to examine the practicality of the combination. It is often possible to combine a tapping operation with and immediately following a drilling operation. If, however, the holes are blind and no successful method of removing chips from the holes has been incorporated in the machine then the tapping part of the combination is in trouble. It is very frequently possible to put a precision boring spindle for finishing in combination with a preceding drill. If, however, the part is being deflected either directly or by poor indexing the precision boring will not be very precise.

The combination must be of such nature that the effectiveness and accuracy of the individual operations is not impaired.

Having weighed all the factors and concluded to combine operations the next question is:

3. How shall they be combined?

Here again a good many subordinate questions must be resolved before a proper decision can be made and no hard and fast formula will yield the desired result.

Primarily, there are only two kinds of operation combinations from which to choose. In one the part is fixed and the various tool spindles are grouped around it. In the other the part is moved into and through two or more positions and thus passes successively under the various tool spindles. It has become the fashion recently to add a third kind of combination to which the term "transfer machine" has been applied. Actually it is basically a machine of the second type in which the part is moved to and through the various tool positions. It has two marked differences from the rest of the type. First, normally only the jig or fixture is returned to the starting point whereas in the prototype the part is also returned to the starting position. Second, it lends itself to the application of much larger and heavier machine units than is ordinarily feasible with the rotating type. It must not be forgotten, however, that the so-called transfer machine is as much an attempt to solve the con-

veying and loading problem as it is a matter of combining operations. Generally, although there are many minor factors to be considered, the main point in deciding how to combine the operations becomes a matter of whether the operator should move from station to station or whether he should remain in one position and the part be moved to and from him.

From many angles it is best to start with the assumption that the rotating, or index, type of machine should be selected unless other conditions absolutely prohibit it.

In any event and no matter which type of combination is chosen the plain fact is that if we have decided by all these steps that we ought to combine operations we are now face to face with the great bug-a-boo of machine tool builder and user alike—the special machine.

So it is pertinent at this juncture to ask question number

4. Should anybody ever buy a special machine?

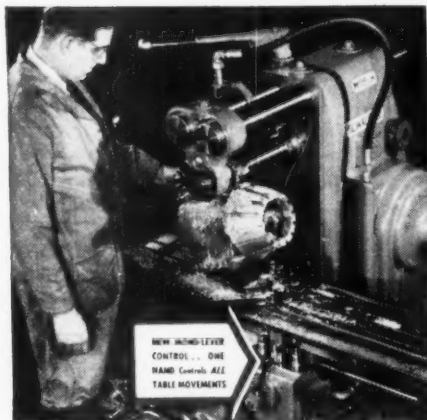
I mean, of course, anybody but Chevrolet, Plymouth, or Ford and those others who measure machined quantities in thousands per day. I point to the question because there is an assumption abroad in the land that the special machine is only for such high volume producers and is high folly for everyone else.

Fortunately for the machine tool builder and user alike this assumption is not true.

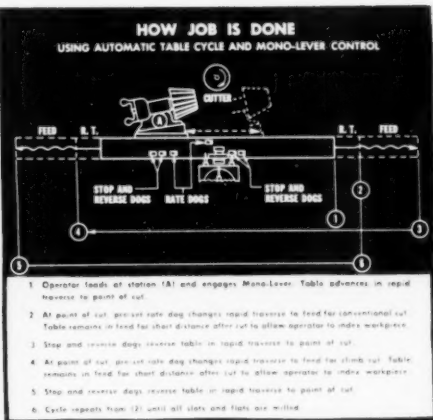
The trouble is that the economies of the special machine are largely relative whereas those of the general purpose machine are direct and this difference confuses a lot of people. There a Master Mechanic is confronted with a choice of buying four standard drill presses for \$8,000.00 or purchasing a special machine for the same operations at \$13,000.00 it is a simple matter to select the standard machines and thus save \$5,000.00. But it is not necessarily a logical choice. The real basis for a sound selection is not the \$8,000.00 or the \$13,000.00 but what does he get for the \$5,000.00 difference in price. In the majority of cases he is going to spend

Looking for savings?

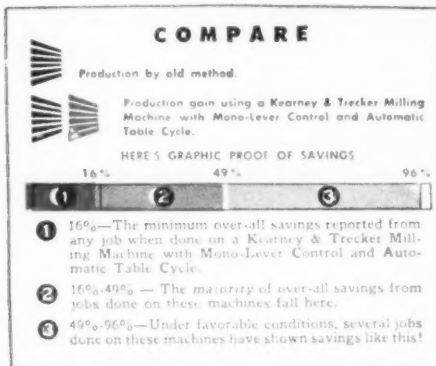
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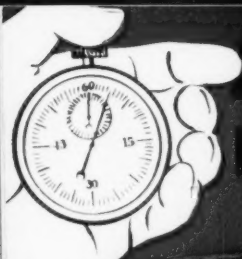
the \$8,000.00 in any event and under any circumstances. In return he is going to obtain certain results. The problem then is how much better results can be obtained for the additional \$5,000.00. It is astonishing how frequently the extra expenditure is worth while. Ten years ago we found double end, multiple station, trunnion type special horizontal drilling and reaming machines for cross holes in universal joint yokes far more profitable than any more standard type of equipment even though lot quantities were as low as 50 of any one size of yoke and seldom greater than 500. In this same connection, although it has nothing to do with the matter in hand, I want to digress to inform you we have learned that under the proper circumstances it is cheaper to run quantities as low as 35 in a lot on a Bullard Multimatic than on any more simplified equipment.

Last January we placed in operation a new line for machine transmis-

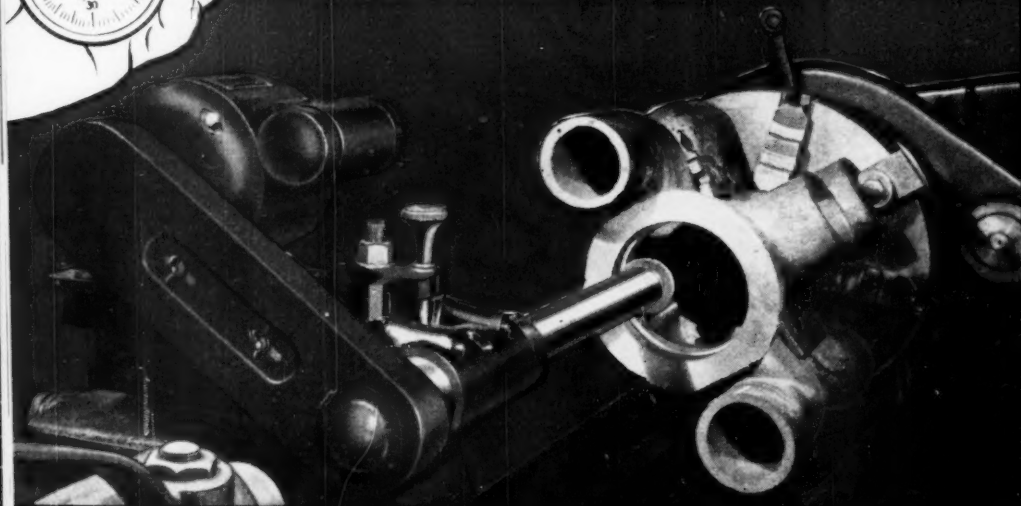
sion cases. The aggregate requirement is never expected to exceed 160 cases in 24 hours and the variety is such that the line rarely operates more than 3 or 4 days on any one case. Two-thirds of the equipment is special and built for some specific combination of operations. There are special precision boring machines, special drilling machines, special tapping machines, special milling machines, special counterboring machines and special elaborate tooling such as the Atchison, Topeka and Santa Fe set-up mentioned earlier. We spent roughly \$225,000.00 to set up the line although it could have been done with standard equipment for \$145,000.00. But whereas an investment of \$145,000.00 would have netted us a labor saving of 25¢ per case the expenditure of the additional \$80,000.00 for special machinery resulted in a total labor saving of \$1.85 per case or \$1.60 per case for the difference between standard and special equipment. It would seem, there-



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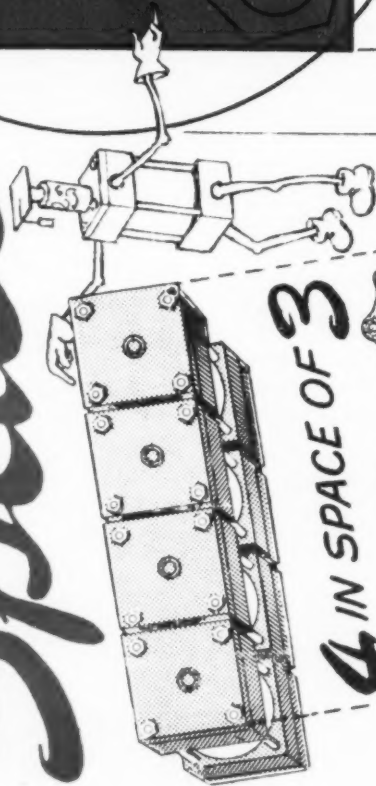
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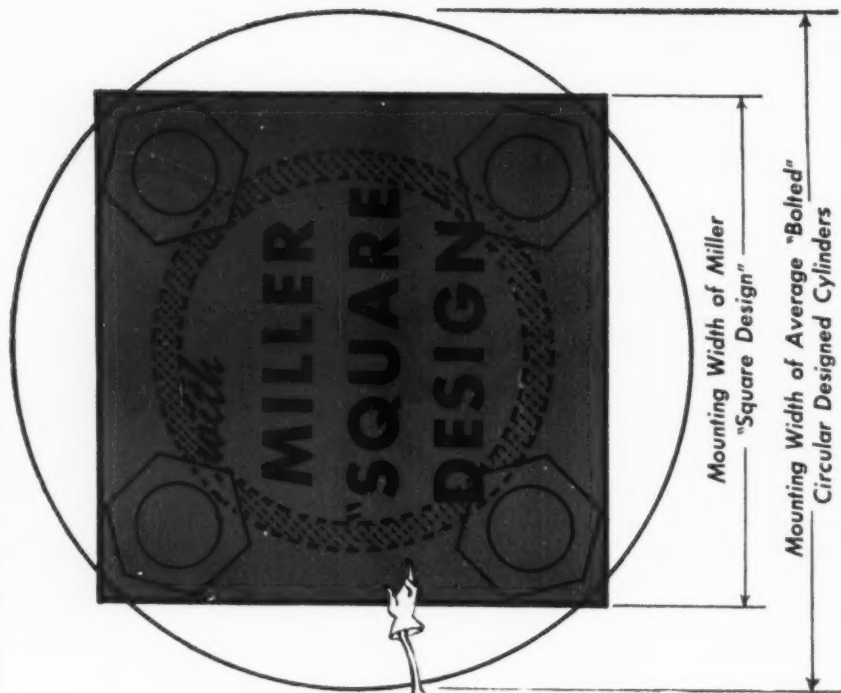
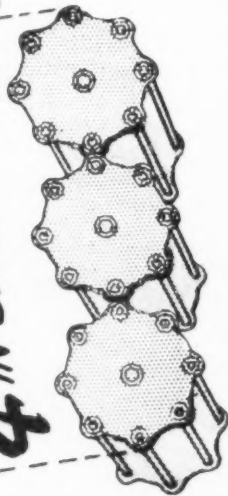
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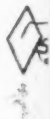
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4 IN SPACE OF 3



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Other important *standard* features of all Miller Cylinders include: solid steel heads, caps and mountings, hard chrome plated piston rods, dirt wiper seals, and other "quality" features as shown in illustrated bulletins sent **FREE** on request. Remember, too, that Miller Hydraulic Cylinders (2000-3000 psi) meet the J. I. C. Hydraulic Standards.

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fore, there is need in every tooling program to face up squarely to an examination of the feasibility of using special machinery.

Who Shall Build the Machine?

I turn now to the second phase of our machine problem, namely, deciding who shall make the machine. Having gone through the series of steps just described we end up with a list of equipment which must be built by someone. Much of it is standard flexible types which require little or no further engineering and which can be obtained, in due time, from any of several sources by the simple matter of placing an order. Other items are more or less special and demand a different approach than the standard machines.

As a prologue to this dissertation on the selection of the builder let me say there are two things which seldom enter our equations although I know they are considered of prime importance in many quarters. The first of these is price. Our chief concern with that question is that the builder make a profit. We cannot afford to do business with a machine tool builder who is going to go broke next year. We carry this to the extent of asking him, and in some cases, warning him when we think he has made a mistake in his estimates, or has not fully grasped the problem.

The other is the matter of production per hour. It is our belief that the machine tool builder should be called upon to declare that his machine will have the necessary power, rigidity, accuracy, and range of speeds, feeds, and motions to perform the work the Master Mechanic wants to do. How much of such work the Master Mechanic obtains from the machine is the responsibility of the Master Mechanic, not the builder. I am not saying the user should not utilize the long and broad experience of the builder, I am saying he should never buy one builder's machine in preference to another simply because the one guarantees him a production of 100 pieces per hour while the others, being more cautious, estimate he should bet at least 80 per hour.

The final selection of who shall build the machines is based on the result of

weighing several factors. The first of these is delivery. We very rarely pay any attention to the delivery time stated in a quotation. We pay a great deal of attention to the statements of the agent or representative of the builder. But if other things are equal we use the builder's past performance as a coefficient to evaluate his desirability as a supplier. It is, in fact, the determining factor as regards the question of delivery.

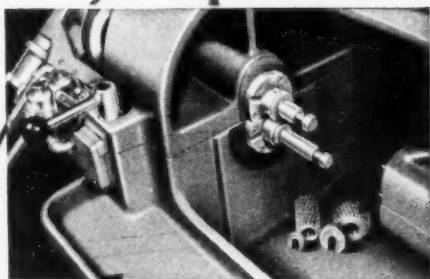
The next factor involved is the presence, or absence, of machines already performing the operation. If we have two Fays operating in conjunction with a centering machine and we propose to put a 3rd turning machine into the group it will almost certainly be another Fay regardless of any other factor.

In addition to these two determinants it is necessary to decide whose turn it may happen to be. There are always foremen or operators who feel they cannot do a satisfactory job on any but one given make of machine. Depending on the individual it may be either a Landis, a Norton, or a Cincinnati. It may be either an American, a Monarch, or a Lodge and Shipley. The Master Mechanic, however, cannot afford to center his affections in any such fashion. He need not necessarily divide his purchases proportionately but the nearer he can approach it the better off he will be.

Selecting the Builder

In the matter of selecting a builder for the special machines one factor outweighs all others. That is organization. The old line machine tool builders do not have it. They have the necessary engineering staffs and experience but they do not have the psychology necessary in the production departments. Most of the johnny-come-latelies do not have it either. They have the explosive production qualities which are essential but they do not have the sound engineering requirements. As a result the selection of a builder for special machinery becomes extremely difficult. In the end it must be based largely on the experience and record of the proposing builder. It can be very

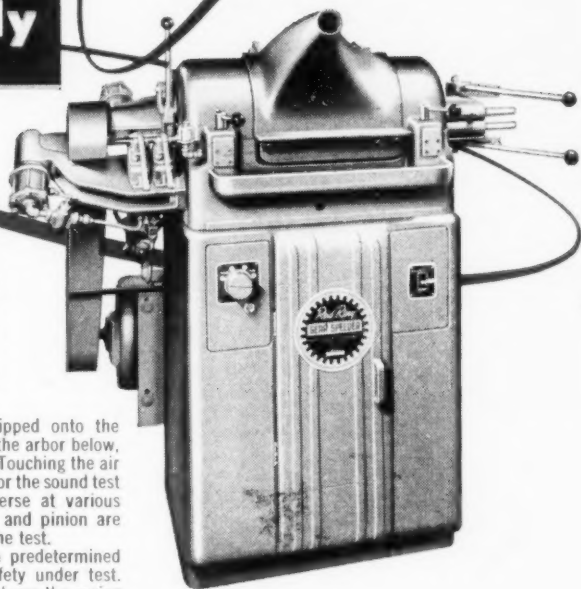
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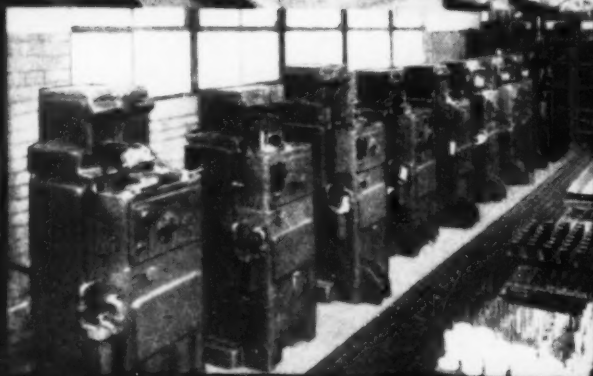
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production of accurate fine-pitch gears because of its high cutter reciprocating speeds. The teeth in this 36-tooth, 64 pitch, steel face gear are generated with an 18-tooth Fellows cutter, operating at 2000 strokes per minute. The feed per stroke is .0016", and the cutting time, 1 minute 50 seconds. A twin-head indexing fixture reduces handling time to a minimum.

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unsatisfactory if a poor choice is made.

One of our experiences is typical of the pitfalls in the path of the Master Mechanic who is attempting to have a special machine built. A few years ago we were forced to acquire additional equipment for grinding the arc on the back face of a different pinion mate.

The method in use was the oscillation of the part in an arc across the face of a grinding wheel while the part was being rotated. Stock removal was small but finish and accuracy were important. Production rates were reasonably good but we thought the process could be improved by building a special machine of rotating type which would require only loading and unloading. The upshot proved we were right, but it took a year of agony to find it out.

The first thing that happened was that five old line grinding machine concerns turned us down flat on our proposal, or offered to do the job in some way which would fit their standard equipment but would not give us the result we wanted. Then several specialty shops galloped in and volunteered to

build any number of machines for us but investigation revealed none of them had ever designed or built a grinding machine. After a good many weeks we arranged as a last resort, to have the machine built by a manufacturer of a standard line of lapping machines on the theory that our job was akin to his regular work.

However, he scared us to death at the outset by quoting a price of \$8,500 for a machine we knew he could not build for \$15,000. He also promised to deliver the machine in six weeks although he had that amount of engineering alone to do. When we remonstrated with him as to the accuracy of his price and delivery he retired to his office and after a season of prayer came back and admitted he was a little hasty in his estimates and quoted a new price of \$8,750 and eight weeks delivery.

We gave him the order. It took him six months to build the machine and he lost over \$7,000 on the transaction. He then spent weeks asking us to make up his loss. We probably would have

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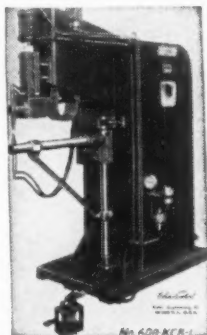
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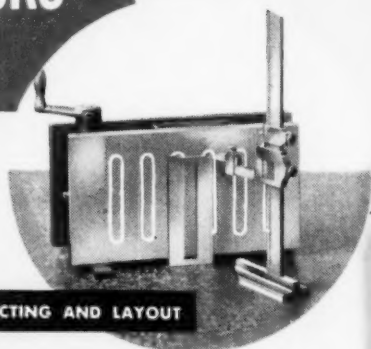
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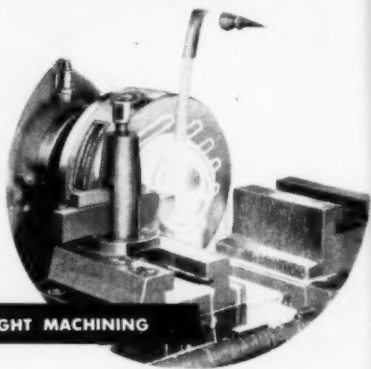
Brown & Sharpe Magnetic Chucks are available in 8 Rectangular Models up to 12½" x 36"; in 3 Rotary Models 5", 7", 9" diams. For sale only in the United States of America and its Territories. Write for complete catalog. Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.

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met him at least partway on this request except for the fact that the machine wouldn't work. Bores were out of square with bearing surfaces and with other bores. There was scarcely a machined surface on the entire unit which was square with any other surface.

Ultimately, we replanned and rescraped the machine and surprisingly enough it worked like a charm. Then we needed a second machine. It cost \$32,000. It would have been much better for everyone concerned if a stable, capable builder had quoted us \$20,000 per machine in the first place. **THE END**

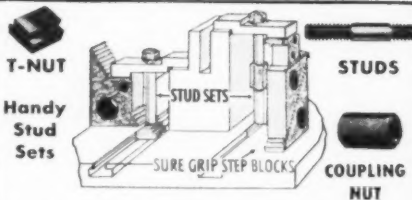
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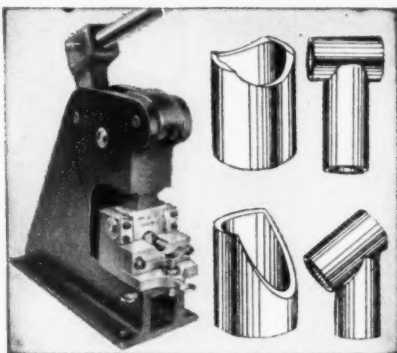
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Foremanship Forum

Wage Payment Policies, Part 1

by Ed Mottershead

How much is a man worth? Can we say that a man who works with his hands is worth between \$1200 and \$3600 a year, while a man who spends his time over a drawing board is worth from \$2400 to \$10,000? Can we say that the worth of a worker, supervisor, or manager can be measured in money? Certainly to put any definite limit in dollars and cents on the worth of the labor of any type of individual is to claim that not only do the agencies or people setting the value know fully and completely beyond any shadow of doubt what is "right", but also that we have at this wonderful stage of our civilization attained the maximum in human development beyond which there is no improvement.

Perhaps I already hear a few snickers in the back rows at the ideas just set down. But the fact that in many instances both management and government agencies operate on definite policies that a certain type of work or a certain class of individuals are worth so much and no more means that these two ideas exist if only by implication. Anyone who stops to think a minute will admit the fallability and imperfection of mankind, and we see evidences on all sides of us where improvements and developments in human ability and

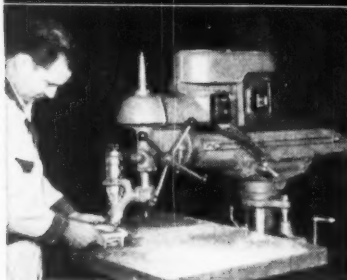
understanding are occurring daily, that we have only scratched the surface of human development. Naturally, we react against such arbitrary limitations, whether we are in the ranks of management or labor. But the fundamental issues go much deeper than that, and a great deal of our contention and difficulty springs from the fact that certain basic social forces and historical facts have been overlooked.

We see that corporation income taxes and personal income taxes are taking an ever increasing part of our "profits." We see rising costs, rising prices reducing the margin or profit. We have seen at the same time a great effort to introduce bonus and profit sharing and incentive plans to increase production. The average worker, foreman and stock-holder might well sit down and wonder what it is all about.

The fact of the matter is that not only is the idea of "labor" in the open market at a "price" passing out as minimum wage laws and collective bargaining strengthen labor's position, but these and other controls appear to be but a transitional stage to some form of compensation to the individual which will more truly represent his contribution to the productivity of the industrial group . . . witness several recent labor-management negotiations in which the profit position of the company was examined to see just how far labor could reasonably go with its demands.

ACCURACY TO .0001"

FOR TOOL ROOM AND PRODUCTION



FOR AS LITTLE AS

\$117⁵⁰

◀ Finishing small wood pattern at 45,000 R. P. M. with the new PRECISE SUPER 40.

IN PRECISE MOUNTS ON LATHES AND OTHER MACHINE TOOLS, PRECISE GRINDER-MILLERS WITH 1/4 H.P. AND SPEEDS FROM 20,000 TO 45,000 R.P.M. DO THE WORK OF SINGLE-PURPOSE MACHINES COSTING 100 TIMES AS MUCH!

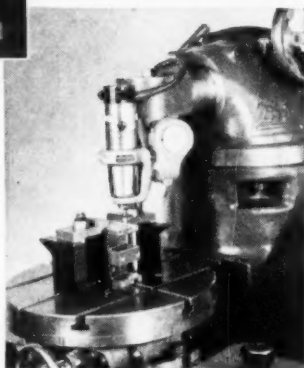
VERSATILITY. For cylindrical, internal, external and form grinding; for milling with H. S. steel or tungsten carbide midjet mills; for micro-finishing and polishing. Use on wood, glass, rubber, plastics, or any metal including the hardest alloy steel.

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Write FOR NEW CATALOG

PRECISE PRODUCTS CO., 1331 Clark St., Racine, Wis.



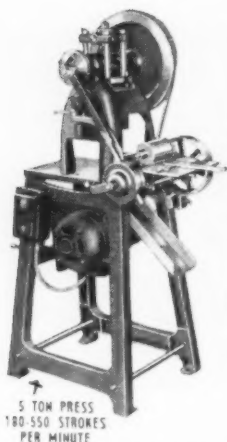
▲ PRECISE SUPER 50 grinding die section in Compound Universal Mount on Bridgeport Mill.

PRECISE GRINDER-MILLERS

Where heretofore we have had Taylorism, day work, piece work, Halsey premium, Gantt task and bonus plans and a host of others, the basis of all these attempts as incentive pay was "how to get the most work for the wage dollar". Incentives were only useful in wage payment plans insofar as they increased efficiency or increased production to the end that overhead costs per unit were reduced and profits for management and owners increased.

However, there is a growing realization that the very concept of profit as

such is an heirloom of a badly battered pre-industrial mercantile economy. There is a growing realization that the owners or stockholders have no vital interest in the industrial enterprise beyond the fairly stable and relatively small income due them as a fee for the use of their capital investment. When large lending institutions make business loans for long terms at 2%, and other agencies carry out a vast financing program at 4% and 4½% on 20 or 25 year loans, it appears unreasonable to many people that investors should



5 TON PRESS
180-550 STROKES
PER MINUTE

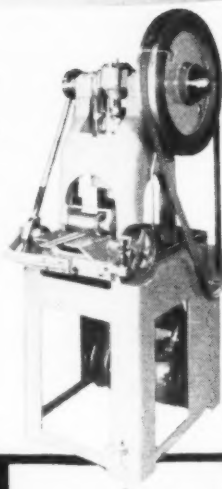
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INVESTMENT
RECOVERED IN
83
WORKING DAYS

with **DIEBEL HI-SPEED
AUTOMATIC PRESS & DIE***

Production was boosted from 52,000 pieces to 95,000 pieces per day. Maintenance charges were reduced and floor space requirements cut. Costs were permanently lowered and a better competitive position reached. This is what a manufacturer accomplished by replacing conventional equipment with our Hi-Speed Automatic Press.

Ask Us What We Can Do For You

*Die designed and built in our modern tool room.



12 TON PRESS
65-300 STROKES
PER MINUTE

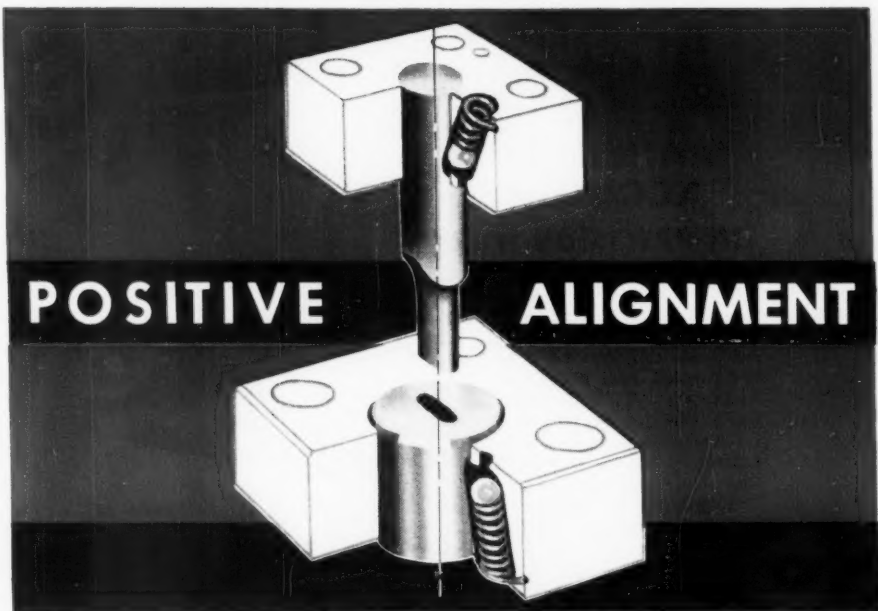
DI MACHINE CORP.

2712 IRVING PARK ROAD, CHICAGO 18, ILL.

demand much more. Particularly since the government has stepped into the picture through taxation as the one major interest which has a prime stake in increased profits, neither management nor stockholders receive any great increment to their share of the profits as a result of increased production or lowered costs.

We used to talk about the four factors of production . . . land, labor, capital and enterprise, and about the economic problem of distributing the proceeds of production among these fac-

tors. The fact is that under present conditions, land and capital are in essence pensioners living off small annuities, while enterprise as a function has passed from the owners and investors to the hired managers, who are in essence "workers". Consequently, while not espousing into the labor theory of value, it is becoming more and more apparent that the real proceeds of industrial production should go to those who create the values more or less in relation to their individual productivity. Hence, the logic of some form of incen-



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... once inserted ... a simple matter of a push and a twist ... stay in place, accurately positioned both vertically and radially. A ball bearing in the R•B retainer, engaging in the specially designed ball seat in the shank of the punch or outside diameter of the die, keeps the punches and dies perfectly aligned until they are released. That's why you are always assured of trouble-free punching, plus the economies of simple installation

*Richard Brothers

and quick changing, when you use R•B interchangeable punches and dies.

R•B standard punches and dies are stocked for immediate delivery. Punches and dies of special sizes, shapes and materials made promptly to your specifications.

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SIGOURNEY M-100

MAINTAINED ACCURACY

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The Sigourney M-100 Bench Drilling Machine is extremely accurate on precision jobs. It is unusually sturdy and rigid in construction . . . has hardened and ground spindles . . . and sealed ball bearings throughout. All moving parts are entirely closed for maximum operator safety. M-100 is built for long and steady service.

This sturdily constructed bench drilling machine is available in 1, 2, 3 and 4 spindle models . . . speeds from 4,000 to 10,000 r.p.m.



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West Hartford, Connecticut

tive pay, both to labor and management, is inescapable, but its rational justification and its detailed application must be upon bases which are in accord with present realities rather than founded upon economic concepts no longer valid.

Richard T. Ely, certainly a competent if traditional economist, in the sixth edition of his **OUTLINES OF ECONOMICS** formulates what he calls the law of economic change: "Since man first learned to use the external forces of nature for his own ends, as power

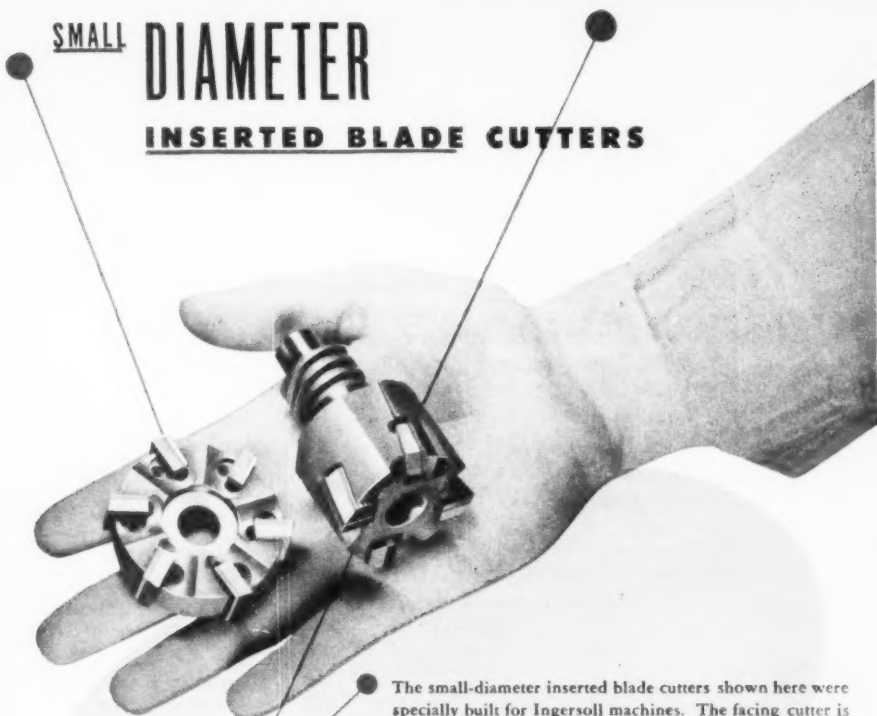
applied through machinery, changes in production and physical distribution have taken place with greater rapidity than have those changes in habits, customs, and institutions, which gradually bring about the necessary adjustments of human relations to economic realities." As a general rule, the more rapidly the technological advances are made, the greater the maladjustments in economic relationships, and the greater the resulting economic misery. It is psychologically impossible for habits and customs to be altered with suf-

INGERSOLL

SMALL

DIAMETER

INSERTED BLADE CUTTERS



The small-diameter inserted blade cutters shown here were specially built for Ingersoll machines. The facing cutter is only $2\frac{1}{4}$ " in diameter and the boring head is $1\frac{3}{4}$ " in diameter.

Standard Ingersoll Shear Clear and general purpose face mills are made with inserted blades in diameters as small as 2"—solid shank end mills as small as $1\frac{1}{2}$ ".

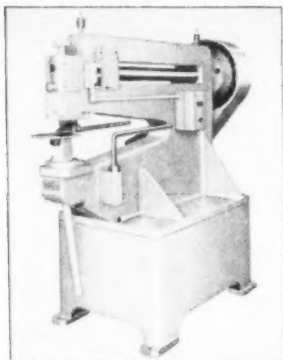
Ingersoll's standard line of milling and boring cutters is a product of our 60 years of experience building special machines and cutting tools.

If you will send us details of your work we will recommend suitable Ingersoll inserted blade cutters.



THE INGERSOLL MILLING MACHINE COMPANY • ROCKFORD, ILLINOIS

NIBBLING..New machine cuts odd shapes from sheet stock up to 1/2 inch



The Campbell Nibbling Machine operates by means of a rapidly moving circular punch over a circular die. The combination of punch and die takes a small "bite" with each stroke of the punch. The cut is made by holding the work against the pilot of the punch and following templet or scribed line. Since the punch

and die are round, work can be fed equally well in any direction. The operator may use both hands in guiding the work, which makes it easy to cut intricate shapes. Multiple speed and adjustable stroke provided.

The Campbell line of Nibbling Machines includes 7 models. On the Model 530, 1/2" steel may be cut from sheets up to 60" wide.

Source: CAMPBELL MACHINE DIVISION

**American Chain & Cable
937 Connecticut Avenue
Bridgeport, Conn.**

ficient celerity to make these adjustments in keeping with the technological changes, and consequently new institutions have to be created by planned and conscious effort to correct the maladjustments.

The old concepts of profit and market and price are as much institutions as banks and clearing houses and governmental agencies, and they are affected by the same economic law of change. It is seldom, of course, that the theories and concepts are created and "sold" to the people so that they are then put

into effect as institutions. Rather, many people, in many different places and under diverse conditions will reach this or that purely pragmatic solution to an immediate problem, and eventually the academicians get together and rationalize the whole picture so that thirty years later we know intellectually and philosophically what we did at the time in order to stay in business and keep going. What we are trying to do here is to point out that already there have been sufficient experiments to point at least part way in the direction of new

Production Pointers

from

GISHOLT



COST
CUTTING
IDEAS



Gisholt—A Unique Service in the Machine Tool Industry

Here you obtain unbiased help on your turning problems, because Gisholt's broader range of equipment includes both manually operated turret lathes and automatic lathes. Gisholt's recommendations are made without prejudice for one type of machine over another.

14 SURFACES MACHINED IN ONE CHUCKING BY NO. 12 HYDRAULIC

MULTIPLE OPERATIONS HANDLED IN 74-SECOND CYCLE

The part being machined here is an important component in Packard's automatic transmission, "Ultramatic." It's a cast aluminum transmission converter pump.

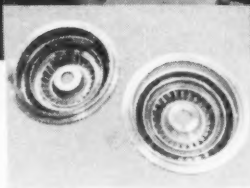
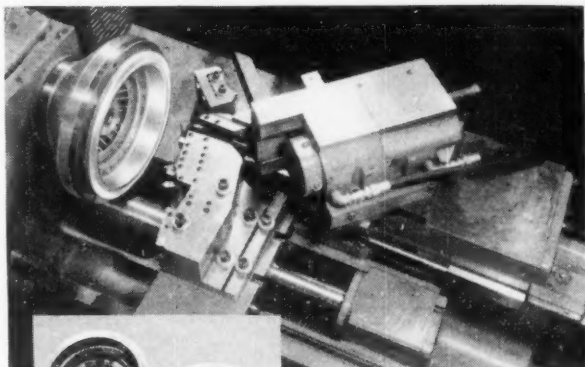
The trick was to machine all fourteen surfaces in one chucking. The Gisholt No. 12 Hydraulic Automatic Lathe got the job because it does this—and machines them so well that no further processing is required.

VACUUM CHUCKING FIXTURE USED

The part is held by a special vacuum chucking fixture. A rubber collar in the center and a rubber ring around the $13\frac{1}{2}$ " diameter seal off the back of the part. Air is removed, forcing the part against the locating buttons where it is held under constant vacuum.

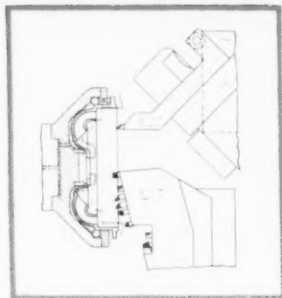
The standard front carriage has nine tools which feed both into the work and across the faces—to bore, turn, face and chamfer in a single operation.

At the rear are two standard slides. The main slide moves parallel to the spindle centerline, while the auxiliary slide is mounted at an angle. Although only one tool bit is used, this



With this tool setup, the No. 12 Hydraulic machines all 14 surfaces in one chucking. Inset shows part as raw aluminum casting and after machining.

turns the radius on the hub as well as faces and breaks a corner on other sections. As the main slide feeds toward the spindle, the auxiliary slide picks up a cam and generates this radius for a distance of 1.781 inches. It then feeds backward to face and break the corners on the other sections.



The complete operation takes 74 seconds, floor to floor, giving the required production. Just as important, this rate means maximum tool life—and, therefore, less non-productive time.

TO GET MORE OF YOUR MONEY'S

SMART TOOLING SLASHES CRANKSHAFT MACHINING TIME 80%

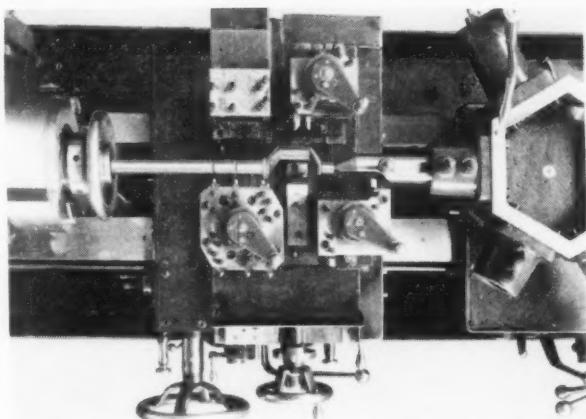
FINISHING OF CRANKPIN AND BEARING SURFACES IN SAME OPERATION DOES THE TRICK

Another case where headwork pays off! Sharp production men came up with this nifty tooling on a Gisholt 2L Saddle Type Turret Lathe to drive costs way down on limited quantity work.

The job is a crankshaft for a farm machine. Formerly, it took over an hour per part. Now, with a maximum number of tools working, all surfaces are machined in one chucking—even the crank-throw!

MAIN AND CRANKSHAFT BEARINGS TURNED IN 1 OPERATION

Here's the setup: A special cross slide carries two quick indexing square turrets at the front, with tools for rough and finish turning five shaft diameters. At the rear is a solid block with tools for facing four shoulders on the shaft's long end, and a square turret with tools for rough and



Looking down on a smart tooling setup that boosted production 5 to 1.

finish turning the crank bearings.

The hexagon turret has tools for centering and chamfering the end, and a self-opening die for threading the short end. A lubricated fixed center is used when the main bearings are turned, and an offset center supports the shaft for machining the crank bearings. A special hand-operated indexing collet chuck

is accurately counterbalanced to minimize vibration and bearing strain while the work is running at high speed off-center.

Result of this setup: a completed crankshaft every 12 minutes—a worth-while financial return to prove conclusively that machine tools are "The World's Best Investment."

A LITTLE SPECIAL TOOLING—A LOT OF "SPECIAL" PRODUCTION



This brilliant job of turret lathe tooling achieves high standards of accuracy, concentricity and finish.

14 SURFACES MACHINED IN 1 CHUCKING TAKES LESS THAN 4 MINUTES ON RAM TYPE TURRET LATHE

Here's an excellent tooling job that pays handsome dividends. The parts—10" fly wheels—have 14 surfaces to be machined. 10 of them (including chamfers) require only 1 cut. 3 surfaces, (including the O.D.) need both a rough and finish cut. The highly accurate tapered bore requires 4 separate passes.

The use of special tools makes this a high production machine. A motor driven speeder permits simultaneous drilling and turning. A back facing attachment saves an additional machining operation. A special tool block on the front slide straddle faces, chamfers both O.D.'s and with a simple lever movement makes the chamfer on the back I.D. of the rim.

Another case of talented tooling on a Gisholt.



OVER-AGE MACHINE TOOLS MEAN

WORTH OUT OF MAN-HOURS

FASTERMATIC REMOVES 27 LBS. METAL IN 17 MINUTES

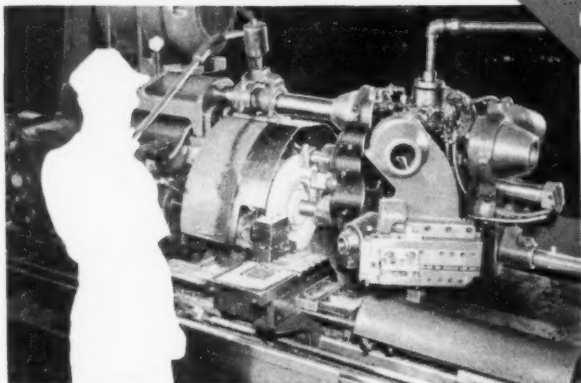
15 SURFACES MACHINED IN SINGLE OPERATION

The job given to this FASTERMATIC is semi-finishing transmission covers, which in rough casting form tip the scales at 95 lbs. Seventeen minutes and 15 operations later they are 27 lbs. lighter —machined and ready to move on.

This steel casting is loaded by electric hoist, and held in 18" air chuck with 3 compensating jaws and 3 jacks. First, the end of the hub is faced from the turret. In the next position, the second face and flange are rough and finish faced from the front and rear cross slides. In the third position, the case is bored full length and counterbored; the O.D. of the second face is rough turned and rough undercut from the turret.

In the fourth position, the counterbore is semi-finished, the O.D. turned and the second face finish undercut from the turret. Next, chamfer of the counterbore is done from the turret. In the sixth and last position, final operations from the turret finish counterbore and finish turn the diameter of second face.

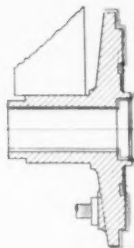
The FASTERMATIC machines all



15 operations are performed by this FASTERMATIC Automatic Lathe to remove 27 lbs. of metal.



From rough steel casting to semi-finished cover in only 17 minutes.



15 surfaces automatically, providing a machining efficiency of 92% on the floor-to-floor time per piece.

Operations required to machine transmission case.

HOW TO MACHINE BOTH SIDES IN 1 CHUCKING

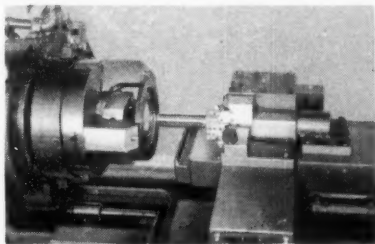
Handle any parts like this bevel ring gear? Then take a tip from this setup and save both an added operation and an extra handling.

This Simplimatic Automatic Lathe is used for both boring and facing. Piloted tools on the center slide rough and finish bore, as well as chamfer. Tools on the front slide rough both outer faces, while finishing is done from the rear slide.

The back facing attachment is

cam operated and mounted inside the spindle. Just before the finish boring tool engages the work, this attachment faces and chamfers the back counterbore.

A Gisholt-Barker Wrenchless Chuck holds the work. This is air actuated from an external cylinder to leave the spindle free to contain the back facing attachment.



Fast machining of both gear sides in one chucking and one operation.

UNDER-PAR EFFICIENCY...REPLACE NOW!



**COST
CUTTING
IDEAS**



**COST
CUTTING
IDEAS**

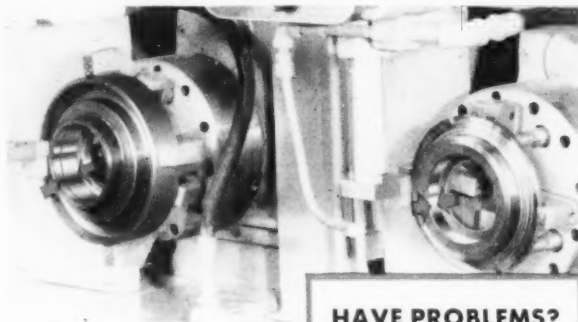
SUPERFINISHING INTERNAL SURFACES SAVES ALL AROUND

**TAKES SECONDS
WHERE GRINDING
REQUIRED MINUTES**

No wonder Superfinish is gaining so many boosters! Take this case: The internal finishing of automatic transmission parts. Costs were too high, time too slow with the old way of grinding down these internal surfaces to 10 micro-inch finish. Tricky work, too—because it was necessary to "spark out" to hold the tolerance. It often took 4 to 5 minutes per part.

GRINDING TIME CUT

This manufacturer found that lots of hours could be saved by Superfinish. Today the parts are ground to only 30 micro-inches instead of 10. Real time savings on this alone. Then, on a Model 54-A Two Spindle Horizontal Superfinisher, the parts are brought down to 10 or less micro-inches, removing approximately .0002" stock. This



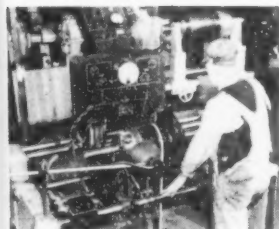
operation: only 15 seconds, floor to floor.

3-WAY BENEFITS

A look at the score convinced this manufacturer that he's saving three ways. *First*, he's getting far better finish for a better wearing surface. *Second*, time is cut from about 4 minutes to less than 1 minute. *Third*, machine investment is lower, and a single operator handles both spindles.

HAVE PROBLEMS?

If you have a problem in the finishing of cylindrical surfaces, contact your Gisholt representative. To get the full story on Superfinish, write for the book, "Wear and Surface Finish." It's free—and excellent reading.



In foreground is DYNETRIC Type S Balancing Machine which handles all types of armatures up to 300 lbs. In the background is a DYNETRIC Type U with a capacity of 6,000 lbs. Work piece is a traction motor armature.

RAILROAD MODERNIZATION BRINGS NEW SHOP PROBLEMS—NEW TECHNIQUES

PRECISION BALANCING LENGTHENS LIFE OF ELECTRICAL PARTS

With the trend toward diesel motive power and modernization of passenger car equipment, railroad shops have a marked increase in electrical maintenance work. The greater number of electric motors and generators involves not only the problems of larger volume but also the need to insure longer service between overhauls.

In turning to Gisholt Balancing Machines, many electrical shops report increased service life ranging as high as 300% over previous records. Furthermore, Gisholt Balancers enable

the railroads to handle this rather specialized operation on a routine basis despite the great diversity of sizes and types of armatures, etc. Yet, operators can accurately measure unbalance vibrations as small as .000025". Greater accuracy has resulted in substantial savings—first by reducing the frequency of failures, and second, through the more efficient operation of equipment.

If you have the problem of maintaining electrical equipment, you'll enjoy reading the article, "Precision Balancing." It explains how the railroads are solving this diversified problem. A complimentary reprint of the article will be mailed to you on request.

THE GISHOLT ROUND TABLE represents the collective experience of specialists in machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.



No. 850

GISHOLT MACHINE COMPANY
MADISON 10, WISCONSIN

A general catalog on machines listed below is available on request.

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**SAVE
MILLING
TIME**

SUPER-SPACER

**for quick, accurate indexing
and exact location of work.**

Saves expensive setup time on short or long runs. Ideal for milling, drilling, grinding, planing, slotting, and other operations. Pays for itself over and over. Write for information now!

HARTFORD

Special

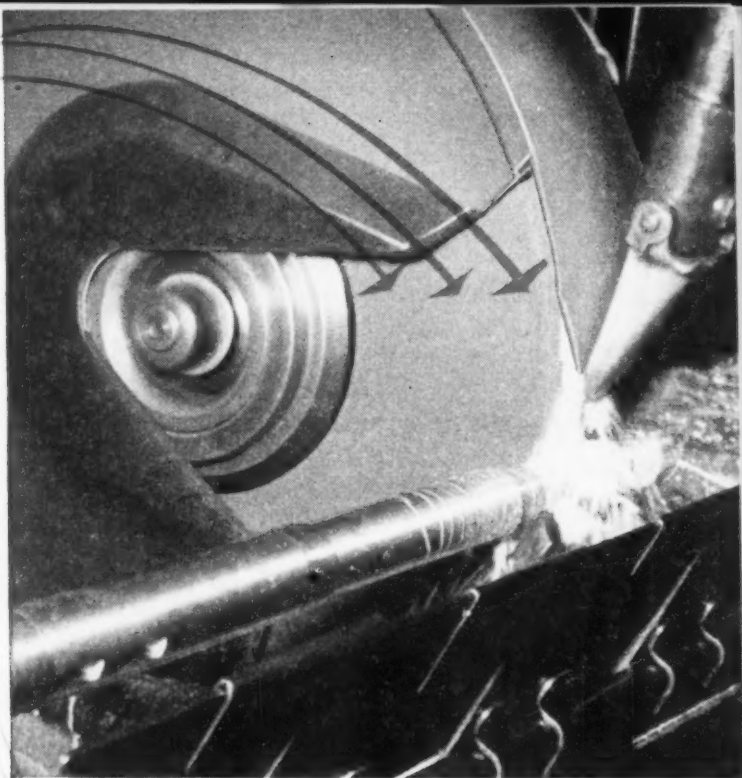
THE
HARTFORD SPECIAL
MACHINERY CO.
HARTFORD 5, CONN.

institutions and new social organizations which will enable us to adjust to the changes already confronting us.

Incentive payments to labor have already been adopted on one basis or another in much of industry. The government advocates bonus and incentive plans. Insurance companies are actively engaged in selling pension plans of one kind or another which are in effect deferred income incentive plans. The reasons why these various groups advocate or install incentives are irrelevant. The important thing is that this trend falls

in line with the realities and compelling necessities of our modern industrial circumstances.

Let us see, for example, what incentive plans have accomplished: One company reports that small tool and drill breakage was entirely eliminated through a bonus plan whereby the company created a "jackpot" from which employees were paid a bonus for non breakage. The more tools a man ruined, the less his share; the better his record, the more bonus. Another company reports that in undertaking a particu-



MOISTURE-PROTECTED **Plus Easier Identification**

Chicago Wheel's new package assures you of a cut-off wheel that will cut faster—has longer life—and, your cutting efficiency can be increased as much as 10%. There's no

loss from storage . . . and wheel can be easily identified through transparent wrapper.

CHICAGO WHEEL & MFG. CO.

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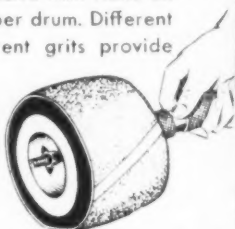
NEW, IMPROVED

NU-MATIC



THE WHEEL WITH THE PNEUMATIC DRUM

With this Nu-Matic wheel the abrasive belt rides on a cushion of air contained in a rubber drum. Different pressures in the drum and different grits provide varied surface finishes. Deflate, and belts can be changed easily and quickly for grinding, sanding or polishing. Cut your labor, production and inventory costs with Nu-Matic grinding units. Adapters for $\frac{3}{8}$ "-11 or $\frac{1}{2}$ "-13 power equipment. (Specify size.)



Adaptable to bench,
portable or flexible
shaft power.

**NU-MATIC GRINDERS, INC., 10304 W. McNICHOLS RD.
Detroit 21, Michigan**

UNiversity 3-2573

lar job estimated to require 100 hours of labor per unit, the first six months of operation showed approximately 220 hours of labor per unit. A group bonus plan was put into effect whereby the producing group was paid 1/3 of the estimated wages saved on increased production above a predetermined quota. Time was out to less than 80 hours per unit, and cash income to workers went up about 75%. Another company recently reported that a similar group bonus plan increased production of crated plumbing units in the

shipping department more than 50% in three days. Another company reported considerable labor unrest and dissatisfaction; after careful consideration they installed group insurance, hospitalization, severance pay and a retirement income plan; dissatisfaction vanished overnight, and turnover was reduced to a minimum. The instances of this sort of thing are endless in variety and number. They are the practical and individual solutions to immediate and individual problems in each case; yet they represent the articulation and satisfac-

for WRENCHES . .

BETTER BUY BILLINGS

BECAUSE



COMBINATION Box and Open Head combines the best features of the Engineers' and the 15° Box wrenches in one wrench. Both ends have the same size opening.

45° ANGLE BOX in both the long and short pattern, with thin sidewalls, openings chamfered for quick location over bolts and correctly proportioned handles in all sizes.

15° and 75° ANGLE ELECTRICAL thin and slender yet with ample strength for carburetor, magneto, generator, radio and electrical work. Each end has practical angle for getting into close corners.

* Special analysis alloy steel heat treated to Billings rigid specifications.

Billings Vitalloy® Forged Wrenches are the aristocrats of the wrench industry! They climax nearly a century of wrench making. Every part of a Billings wrench is designed and produced to accomplish a purpose — accurately shaped openings, tapered jaws, thinner and highly polished heads, smooth rounded handles, sizes of openings clearly stamped, heavy chrome plate over copper and nickel finish — and they accomplish the purpose for which they are intended in the most efficient manner. Billings Vitalloy® Forged Wrenches are lighter, stronger and last longer. Is it any wonder experienced mechanics always reach for a "Billings"?

BETTER BUY

BILLINGS®



WRENCHES & SHOP TOOLS

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THE BILLINGS & SPENCER COMPANY, HARTFORD 1, CONNECTICUT, U. S. A.

WHITNEY METAL TOOL COMPANY

39 YEARS EXPERIENCE

WHITNEY-JENSEN

Nos. 28, 29, 58, 68

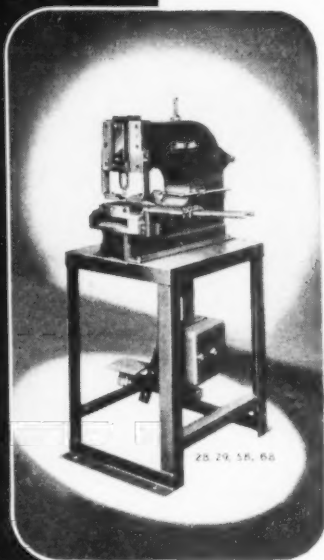
DEEP THROAT TOGGLE ACTION FOOT PRESSES

The deep throats (7', 10', 18', and 24') and powerful punching action of these foot presses permit the handling of a wide variety of work, previously beyond the scope of similar equipment. All sizes, with 5 ton capacity, punch a 2" hole through 16 gauge mild steel.

Height of throat — 6-3/4'
Length of stroke — 1'

Send for Descriptive Catalog

WHITNEY METAL TOOL COMPANY
115 FORBES STREET, ROCKFORD, ILLINOIS



tion in concrete form of the basic desires of both workers and management, and represent an adjustment to the basic economic change pointed out above . . . that labor, which includes management as the basic productive factor in industry, must be compensated closely in relation to the productivity of the individual.

It is not sufficient that incentive wage payments be installed under the sponsorship or advocacy of the government, for such action in too many cases represents just another invasion of the

economic sphere by political bureaucracy, and as far as acceptance by the public is concerned, is just another sop to gain popular support. It is not sufficient that incentive and pension plans be installed by management or by the owners themselves; because such installations are for the most part reluctant half measures designed to keep peace with labor, to make some small concession and to get greater profits with less expense. It is not sufficient that incentive payments, higher piece or hourly rates, or pension plans are

Announcing **NEW** Semi-Automatic **PINES BENDING MACHINE**

**SAVES TIME,
CUTS COSTS
ON
SHORT RUN,
PRODUCTION,
AND
MAINTENANCE WORK**



SPECIFICATIONS PINES SERIES 1400 BENDER

- Maximum Capacity—1" O.D. 16 ga. steel tube.
- Maximum Radius of Bend—8½" to centerline.
- Length of Tubes—Up to 5 ft. standard.
- Bending Speed—29 R.P.M.
- Working Height—35".
- Overall Size (Floor Space)—3' x 7'.
- Pressure—1000 P.S.I.
- Pump Motor—3 H.P.
- Pump—7 G.P.M. (Vickers).
- Optional—Adjustable gages—provision for any length of tube, mandrel for critical bends.

Fast, Easy to Operate—

Forms Smooth, Neat Bends Quickly

Eliminates many slow, tedious hand bending operations. Is especially designed to cut costs on work formerly considered too variable for fully automatic equipment. Fast and easy for one man to operate. Hydraulic bending arm forms smooth, neat-looking bends quickly. Clamp and die rollers (or sliding dies) are operated by hand toggle levers. Hand wheel provides immediate angle-of-bend selection. *Typical production: 300 bends per hour on 1"-16 gage steel tube.*

Ask for An Analysis of Your Bending Problems

Write today for free literature. Find out how a Pines Bender can be applied to your work. Ask for an analysis of your bending problems. There's no obligation.



installed under the compulsion of labor agitation and threat of strike; for such programs are again merely concessions wrested from one party, with threat of violence, by the other, and rest upon a balance between antagonisms rather than upon a mutual understanding of the realities involved.

What is necessary is a new way of thinking. Profit is not the objective of industrial activity. What is? Production for use. Profit in terms of cash is a by-product and must be treated and recognized as such. There is a great

deal of printed matter available on the subject of collateral compensations or supplemental incentives, that is to say, intangibles of recognition of merit, pins, badges, buttons, seniority, etc. Recognition of the individual's worth to the organization, his importance within that social organization, is perhaps more important than the money in his weekly pay envelope, and money alone cannot stir him to increased productive effort beyond a certain point. The fact is that if we recognize that the object of industrial activity is production for

SKILSAW
CUTS DOWN-TIME
and TOOL GRINDS 75%
with Stuart's SPEEDKUT



DATA:

MATERIAL: Stress-proof No. 2

MACHINE: Acme Gridley 2" RB-6

SPEED: Spindle speed 443 (116 pos. per hr.) Surface feet 123

FEED: Form Tool .0012 (.499 core drill .0064 feed)

TOOL LIFE: 12 hours between grinds

COST APPRAISAL: Savings resultant equal 75% less machine down-times; also 75% less tool grindings

THE FIGURES at left speak for themselves. Skilsaw, Inc., noted as being one of the most progressive and cost-conscious manufacturers in the metal-working field, selected Stuart's multi-purpose SpeedKut B for three operations (automatic screw machine, spline broaching, hobbing) on worm gears after placing it in direct competitive tests with other cutting fluids. SpeedKut B is applied straight on the broach while a 6 to 1 dilution is used on the other two operations.

Your Stuart Representative's business is **COST REDUCTION**. Ask him to call and show you how he can help you.

WRITE FOR D. A. Stuart's booklet, "Cutting Fluid Facts"

D.A. Stuart Oil Co.
EST. 1865 LIMITED

2749 S. Troy St., Chicago 23, Ill.

use, and that the values created in production spring from the physical and mental effort put forth by workers and supervisors, designers and engineers, both the "line" and the "stuff" departments, we come inescapably to the premise that compensation must be geared to productivity, and that the productive individuals are entitled to the lion's share of cash income from production. How can this be brought about?

It cannot be legislated. It cannot be done by wresting concessions from one

group or another within the organization. It cannot be done in the spirit of paternalism. It must be done on the basis of functioning industrial democracy. Where industrial democracy functions, there is no strife between "labor" and "management". Where industrial democracy functions, there is no paternalism because each member of the organization is a productive member and has a vital stake in participating in its management. Where industrial democracy functions, there is no "management" in the sense of hired man-



On more and more
spec sheets . . .

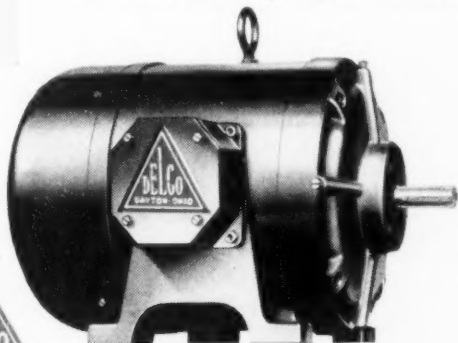
Delco preferred!

- Positioned Bearings
- Delcote Coil Insulation
- Corrosive-Resistant Cast Iron Frame
- Positive Lubrication
- Dynamically Balanced Rotor and Shaft Assembly
- Water-Tight Conduit Box

Two words that mean top motor performance

You see the words "DELCO PREFERRED" on more and more spec sheets. That's because Delco motors are built the way production men want motors built. They are rugged, dependable, and made of the finest materials. A few of the performance extras that Delco motors give you are listed here:

Get complete data on Delco motors. Call or write Delco Products, Dayton, Ohio . . . or get in touch with the nearest sales office listed below.



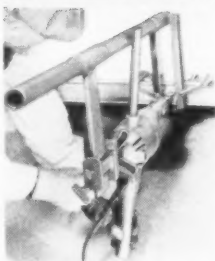
DELCO MOTORS

DELCO PRODUCTS, DIVISION OF GENERAL MOTORS CORPORATION, DAYTON, OHIO

SALES OFFICES: CHICAGO • CINCINNATI • CLEVELAND • DETROIT • HARTFORD • PHILADELPHIA

ON MANY JOBS

... it's hard to handle a heavy drill — keep it steady and apply uniform cutting pressure. With a **SAFETY HOLDER** you can do these things, and use **BIG DRILLS** with **SAFETY**. Once set up, all you have to do is turn the screw feed and maintain a steady cutting pressure. When a "Safeway"—supported drill goes through, it doesn't take a heavy "bite", jerk or twist out of control.



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SAFEGWAY ENGINEERING

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SOLD THRU LEADING SUPPLY HOUSES



**GROBET CHATTERLESS
COUNTERSINKS**

Six staggered cutting edges give shearing cut that eliminates all chatter.

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GROBET FILE CO. of AMERICA, INC.
421 Canal Street N. Y. 13 N. Y.

agement responsible neither to stockholders or workers, because the managers themselves who operate the plant derive their authority from the productive individuals in the organization.

It does not matter essentially whether the form of program, under which the cash results of production are distributed, is upon piece rate systems, upon stock or cash bonus systems, pension plans, or other formal devices. These are merely technical problems of allocating the individual's share of the income. Undoubtedly other and newer techniques will be devised in the future to meet legal and economic requirements, and in any case the full program of any one firm will probably be a combination of different plans.

The essential thing is that the program within a plant will be the result of democratic self government within the plant, based upon the active participation of all concerned. But there is not only the problem of distributing the money which is solved on this basis, the controlling power in industry not only springs from a legitimate base; but in addition the individual in the organization enhances his own feeling of worth and usefulness while he gains in recognition among his fellow workers through both his productivity and his activity in the self governing group.

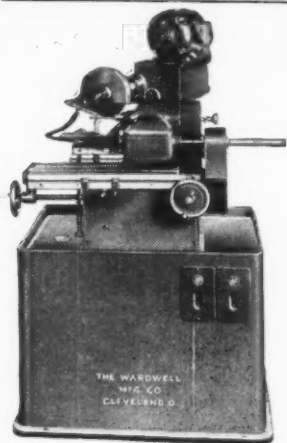
End of Part 1.

Joseph A. Martino, president of the National Lead Co., has been elected a director of the National Cylinder Gas Company, Chicago.

Lou Mervis, president of the Ottumwa Iron Works, Ottumwa, Iowa, announces the appointment of **M. H. Colombo** as export manager of the company's new export office at 1607 Howard St., Chicago.

J. M. Spangler, former director, vice president and general manager of the National Carbon Division of Union Carbide and Carbon Corp., New York, has been appointed president of the division after 35 years of service.

Illinois Tool Works, Chicago, announces the appointment of **Robert F. Dick** as administrative assistant to **Calmer L. Johnson**, vice president and treasurer.



The Wardwell Mfg. Co.
3165 Fulton Rd.
Cleveland 9, Ohio

8-10-50

grinds straight or spiral flutes

**in solid carbide . . .
 . . . indexes automatically**

Wardwell 90FS is a precision grinder that can produce a variety of special size drills, taps, end mills, etc. often at less cost than from regular supply house. The 90FS is a grinder that no tool and die shop should be without as it can save costly delay when a special drill or tap is needed. Grinding angle up to 45°. Spiral leads as short as 5/16" to one turn. Also sharpens saws in gangs up to 7 3/4" long.

*Write today for full description of
 90FS Automatic Universal Flute Grinder*

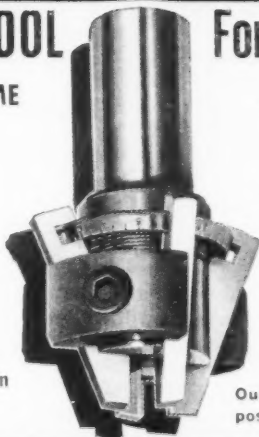
KUTMORE ADJUSTABLE HOLLOW MILLS

THE FINEST TOOL For *Production*

CUTS PRODUCTION TIME

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- TAPERING
- FACING
- CHAMFERING
- TREPPANNING

Any combinations of above in
ONE PASS

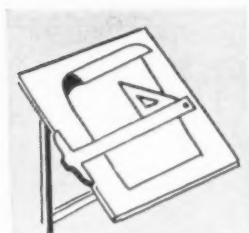


- Exclusive Micrometer Adjustment Feature For Rapid Set-Up.
- Cutting Capacities From 1/32" to 2" Diameter In Standard Stock.
- Blades Quickly Resharp-ened In Complete Sets.

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Our Engineering Dept. is at Your Dis-
 posal on Your Hollow Mill Problems.

CARL WIRTH & SON, INC. 1625 CLINTON AVE. NO.
 ROCHESTER 5, N. Y.



Shop Hints

Fixture for Round Work

A lathe chuck makes an excellent fixture when drilling longitudinal holes in round or hexagonal stock.

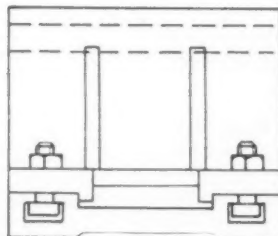
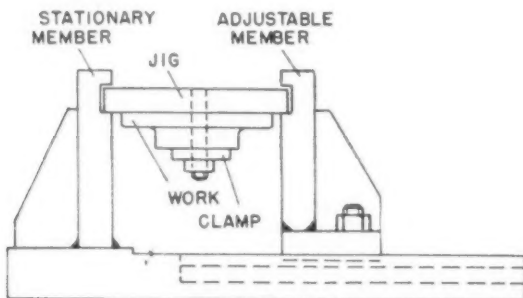
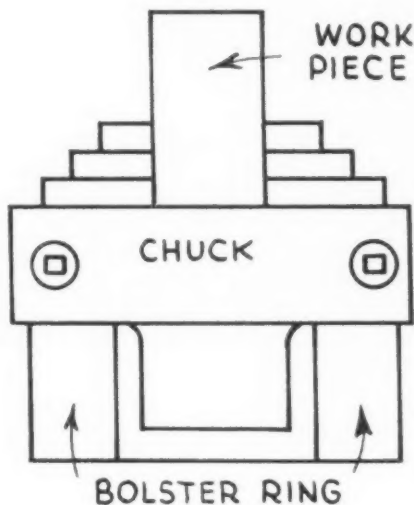
Frederico Strasser, Santiago, Calif.

shown, this stand will pay for itself within a short time.

H. G. Frommer

Adjustable Drill Stand Simplifies Operation and Tool Design

The illustrated stand, used primarily for drill press work will simplify the construction of many drill jigs, as the latter will not require any legs. The stand also resists torque and therefore jigs are not required to be clamped at all. Especially helpful with multiple spindle operation, the stand is adjustable for any width within its range to accommodate larger and smaller jigs. Chips will not accumulate on this type of arrangement as they do on conventional jigs, giving this stand an additional advantage. Made entirely of steel plates, welded and machined as





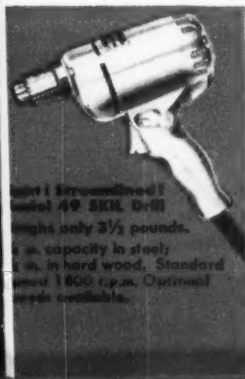
Now the new SKIL Drill model 49

**FIRST with the famous
LAMB Wedge-Lock HANDLE!**

TRY New Model 49 Today!
Feel how scientific, patented
Lamb Wedge-Lock Handle
makes this great new SKIL
Drill seem even lighter than

it is. See how comfortably and naturally weight is spread between
thumb and fingers. Feel how surely it gives safe, firm, easy control.

Here's a drill any operator will take to the minute his
hand takes hold of it. Compact, light, tailored to meet latest
aircraft industry specifications, Model 49 SKIL Drill will boost
your production by hundreds of holes per day. Ask your SKIL
Tool Distributor to demonstrate *today!*



Streamlined
Model 49 SKIL Drill
weighs only 3½ pounds.
1/2 in. capacity in steel
1/4 in. in hard wood. Standard
speed 1800 r.p.m. Optional
speeds available.

SKIL
PORTABLE TOOLS

SKIL Products are made only by

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5033 Elston Ave., Chicago 30, Ill.

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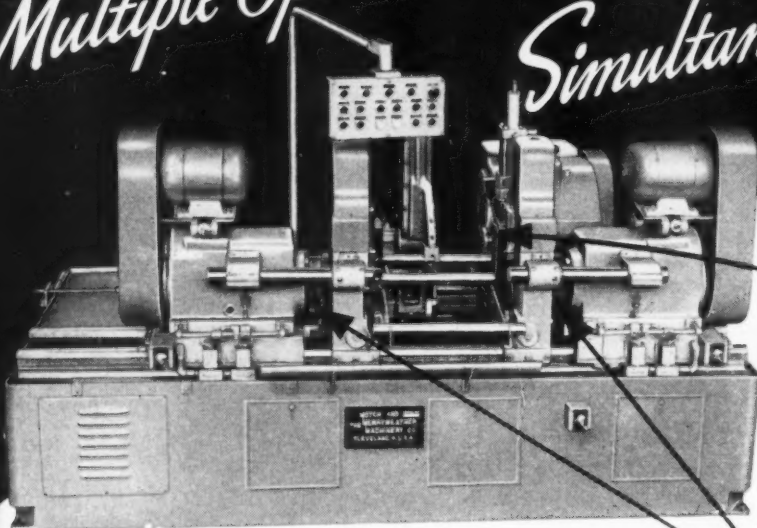
In Canada: SKILTOOLS, LTD., 66 Portland St., Toronto

UNITIZE

Multiple Operations!

CUT OFF TO LENGTH AND
MACHINE BOTH ENDS —

Simultaneously



Cuts Off
to Length

Capitalize on Motch & Merryweather's fast accurate circular sawing by combining it with simultaneous double-end machining operations. Save handling and floor space! Increase output and reduce cost! Unitize your production.



Operation: Cut off, bore and chamfer inside and outside, both ends.

Material: SAE 1020 steel tubing.

Production: 140 pcs/hr. @ 100% eff.



Operation: Cut off; hollow mill and center drill both ends.

Material: C 1117 cold drawn steel.

Production: 84 pcs/hr. @ 100% eff.

Write for further information.



Operation: Cut off; face and chamfer both ends; internal groove one end.

Material: C 1015 seamless steel tubing.

Production: 110 pcs/hr. @ 100% eff.

Machines Both Ends

- Chamfers both ends • Center drills both ends • Center drills and chamfers both ends • Threads both ends
- Turns one or both ends (box tool)
- Chamfers O. D. and I. D. of tubing
- Reams one or both ends of tubing
- Chamfers O. D. and reams both ends of tubing • External groove: and chamfers one or both ends
- Internal grooves, faces and chamfers O. D. and I. D. one or both ends of tubing

Manufactured by

THE MOTCH & MERRYWEATHER MACHINERY COMPANY
715 PENTON BUILDING • CLEVELAND 13, OHIO

Builders of Circular Sawing Equipment, Production Milling, Automatic and Special Machines

PRODUCTION-WITH-ACCURACY MACHINES AND EQUIPMENT





Letter from Great Britain

A process for annealing and forming an oxide coating on silicon-iron stampings for the stators and rotors of squirrel cage electric motors has been developed to use a 70 kW batch-type annealing furnace built by the General Electric Company Ltd., in Britain. The entire process takes place in an atmosphere of partially burnt town gas and results in the stampings acquiring the correct magnetic characteristics together with the necessary coating of oxide as an electrical insulator. Both the oxidising and annealing operations demand careful control in cooling as well as heating and the whole process is governed by automatic control equipment.

The furnace temperature is raised to 700°C before the charge is inserted, whereupon it falls to 540°C due to the quenching effect of the cold metal. The temperature is then gradually raised to 600°C and is held at this value for one hour. The stampings are then subjected to a slow cooling for about seven hours, after which they are removed from the furnace and allowed to cool down to room temperature in air.

A. G. E. C. atmosphere plant supplies the furnace atmosphere. It consists essentially of a town-gas burner which is supplied with a limited amount of air so that the gas is only partially burnt. The plant is capable of producing 300 cubic feet of atmosphere per hour, which is desulphurised before being passed to the furnace chamber.

The stampings are arranged in stacks on holders and placed on trays ready for loading into the furnace. The feed benches adjacent to the furnace have roller tops, and a turntable opposite the furnace door. These arrangements facilitate the moving of the loaded trays in and out of the furnace, which is

fitted with a roller type hearth.

The furnace chamber has a heated length of 5 ft. 9 ins. with a door opening 24 ins. wide and 15 ins. high. Four trays can be accommodated at one time and the charge then consists of some 10,000 stampings.

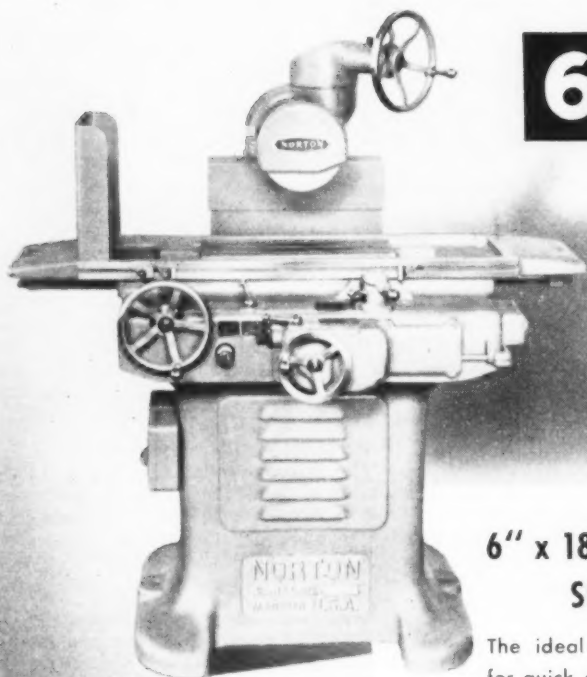
Replacing Fabricated Structures. A noteworthy example of the practicality of replacing fabricated structures by steel castings lies in the production by David Brown-Jackson Ltd., of Salford, of a 28-ton rotor for service in a water-driven turbo-alternator in New Zealand.

It is the normal practice to fabricate these large rotors, using many hundred components in the process, but in full knowledge of the complexity of the undertaking David Brown-Jacksons

Written for the MACHINE and TOOL BLUE BOOK by Robert Hutcheson, Editor of MACHINE SHOP MAGAZINE, London, England.

Better Tool Room Grinding...

That's what you get



6"

6" x 18" HYDRAULIC SURFACE GRINDER

The ideal small surface grinder for quick setup and fast accurate grinding of the hundreds of small flat parts common to every tool shop. Accurate for flatness and parallelism within "tenths."

Like the larger 8" machine it will stand up for steady production line work within its capacity.

Send for Catalog No. 954-14



Abrasives - Grinding Wheels - Grinding and Lapping Machines - Refractories - Porous Mediums - Non-slip Floors - Norbide Products - Labeling Machines

Faster Production Grinding... with these **NORTON SURFACE GRINDERS**

8"



8" x 24" HYDRAULIC SURFACE GRINDER

Combines the convenience of simple controls and the ruggedness for high production manufacturing operations with the high degree of accuracy and adaptability for a wide variety of tool room grinding.

Easy to set up—easy to operate—and hard to beat for quantity and quality of work.

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M-565

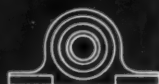


NORTON COMPANY, WORCESTER 6, MASS - New York - Chicago - Detroit - Cleveland - Hartford - Distributors in All Principal Cities

Chicago **DIE CASTINGS**

AVAILABLE from STOCK
for IMMEDIATE SHIPMENT

"V" Pulleys



"Ball Bearing" Pillow Blocks

Yes!—all items illustrated on this page, and many other items not illustrated, are Standard Stock ready for immediate shipment to you. **YOU SAVE—TIME . . . MONEY . . .** when you use Chicago Stock Parts. No dies to build . . . No stock to carry.

"Step" Pulleys



"Bronze Bearing" Pillow Blocks

For complete information
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"Multiple" Pulleys



"Babbitt Bearing" Pillow Blocks



Shaft
Collars



Flexible
Couplings

"Variable" Pulleys



"Babbitt" Journal Bearings



Miter
Gears



Hand
Wheels



Manufactured by
Chicago DIE CASTING MFG. CO.

2515-17 West Monroe Street
Chicago 12, Illinois



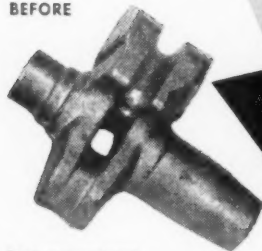
formed the opinion that casting in steel could offer commercial as well as technical advantages.

In their first attempt, they cast the rotor disc in four sections. Two of them were then welded together to form each half of the rotor, and the halves bolted together gave the completed rotor casting. Obviously, casting enabled the ready incorporation of swells to accommodate the machining of the slots for the rotor windings, while maintaining the lightness of the structure as a whole.

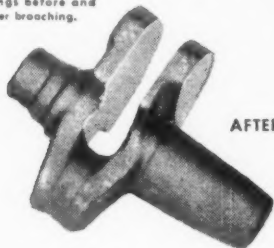
As was expected, the projecting vanes from the flat disc-like surface resulted in small tears at the junction of the vanes and the disc surfaces, and in the interests of soundness rigid inspection was ordered, necessitating the grinding of all fillets, rooting to the base of even the slightest tears and the application of crank detection and Gamma-ray detection.

The experience gained as a result of close technical control of this trial casting supported the firm's view that an even more satisfactory job could

BEFORE



Small steel crankshaft forgings before and after broaching.



AFTER

50-35

Four sets of broaches and an indexing fixture, designed and manufactured by Continental, work together to broach crankshaft forgings at a rate of 54 pieces per hour. Eight broaching passes cut to a total depth of $2\frac{1}{8}$ inches.

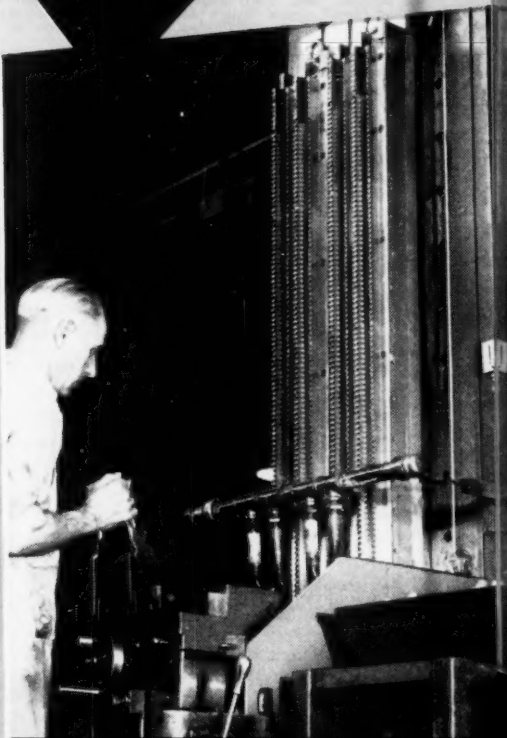
Each set of broaches cuts one deep slot and both outer sides of the counterbalancing members of the crankshaft. The fixture is designed so that it must be fully retracted before parts can be removed; thus new parts cannot be loaded until the fixture is in position for the first cut.

This is a typical example of how broaches and fixtures by Continental can add efficiency to your operations. For full information contact your local representative, or write to Continental.

CONTINENTAL TOOL WORKS

Division of Ex-Cell-O Corporation
DETROIT 32, MICHIGAN

**A WINNING
COMBINATION:**
Broaches and
Fixture by
Continental



Above: Vertical surface broaching machine with four sets of broaches and a four-station indexing fixture. Eight broaching passes are required to cut to a total depth of $2\frac{1}{8}$ inches. Fixture is indexed after each pass by means of a hand wheel.

NEW tapping head **SLASHES COSTS** **on large hole** **tap jobs!**

- * **Production increased as much as 100%**
- * **Drastic reduction in spoilage**
- * **Greatly increased tap life**

This new "TAP KING" tap head is revolutionizing methods . . . cutting production costs on difficult large hole tapping jobs. Daily production gains have run as high as 50-100%! Users report savings in parts spoilage, accurate maintenance of uniform tap depth . . . even on large blind hole tapping jobs!

Features include: Capacity of $\frac{3}{8}$ " to 1" in steel and $1\frac{1}{4}$ " in softer materials; powerful friction clutch; exclusive spline drive, helical back gear reversing mechanism; aluminum housing and many other advantages.

Write for full details today!

Procnier High Speed Tapping Heads are available in 4 sizes with capacities from No. 0 to $1\frac{1}{4}$ "

Procnier Safety Chuck Co.
Dept. 5
14 S. Clinton St., Chicago 6, Ill.
Gentlemen:

Please send me full details on the new Procnier "TAP KING".

Name

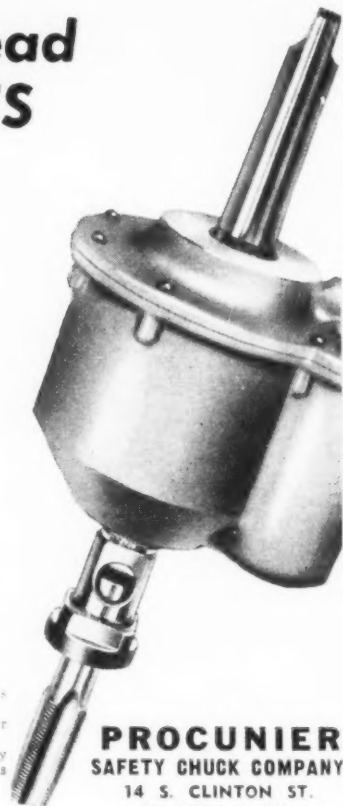
Address

City, Zone

State

NEW!
LARGER!
Procnier
"TRU-GRIP"
Tap Saver

Small size makes tapping easier close to walls or shoulders. It drives the tap by the square, holds it true by the round.



PROCNIER
SAFETY CHUCK COMPANY
14 S. CLINTON ST.
CHICAGO 6, ILL.

be obtained by casting in only two parts and welding them together.

This has since been done and a highly gratifying result achieved for a rotor which is 14 ft. 8 ins. diameter and 3 ft. 6 $\frac{1}{2}$ ins. wide for an alternator to deliver 20,000 kVA.

The second exhibition of mechanical handling equipment was held here in London in June and had an attendance of 35,350 visitors, all of whom were directly interested in materials handling problems. The exhibition was organ-

ised by the technical periodical, "Mechanical Handling", whose editor, Mr. P. J. Joynes, organised a convention which ran concurrently with the exhibition. Sixteen sessions were held at the convention, which were attended by over 6,000 visitors.

The town council of Scunthorpe, in the county of Lincolnshire, have in their employ 293 workmen who, during the year which ended on May 2nd, lost 5,277 days between them owing to absence through illness. Two years ago,

FOR EVERY JOB!



40
MODELS

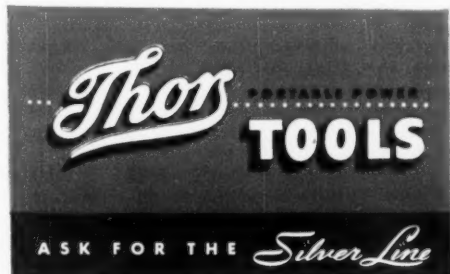
PORTABLE ELECTRIC
DRILLS

From a midget type $\frac{1}{4}$ " models to heavy production $1\frac{1}{4}$ " machines, there's always the one best drill for the job—a THOR . . . all handle styles, all popular speeds—every tool packing Thor's extra power . . . featuring the light weight and handling ease of Thor's modern design . . .

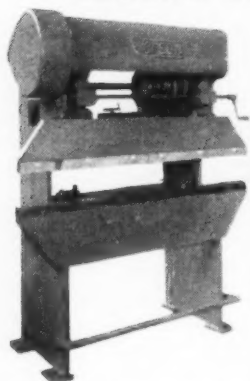
available with stands and accessories. Call your Thor distributor for a free demonstration—or write for Catalog E-2. Independent Pneumatic Tool Co., Aurora, Ill.



No buyer's file is complete without Thor Catalog E-2.



Slash metal forming costs...



Shops that are wasting manpower with hand brakes or tying up big machines with small odd jobs have the answer to their problems in the new Verson 16-48 Press Brake. Compact and low in cost, the 16-48 brings the advantages of power operation and big brake design to smaller shops. Bed and ram length is 48". Capacity ranges from a 48" length of 16 ga. steel to a 24" length of 10 ga. steel. Allsteel construction assures perfect alignment and maximum rigidity. Write for a copy of Bulletin 16-48A; it gives complete design details, specifications and capacities.

VERSON ALLSTEEL PRESS CO.

9303 S. Kenwood Ave.
CHICAGO 19, ILLINOIS

Holmes St. and Ledbetter Dr.
DALLAS 8, TEXAS

**THERE'S A Verson PRESS BRAKE FOR EVERY JOB
FROM 15 TONS UP!**

the Scunthorpe council introduced a scheme whereby they pay full wages for the first thirteen weeks of sickness and since the introduction of this scheme, absenteeism, for which illness is the excuse, has increased alarmingly.

The General Council of the Trades Union Congress, which is an affiliation of 187 unions, has decided to abandon its policy of rigorous restraint of wage increases and has discarded the policy

of persuading its affiliated unions to accept a ban of twelve months on general increase in pay. The cost of living is increasing and arguments are advanced that there is no longer any necessity for restriction of wage increases. The General Council, however, do not share this view and feel that there is not sufficient realisation of the assistance we have received from the United States, Canada and other Commonwealth countries.

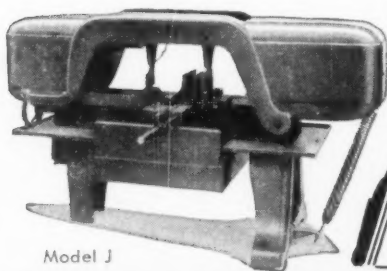


EXTRA SPEED..!

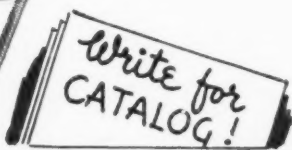
Save time, eliminate production slow-up and reduce labor costs by using this highly efficient metal cut-off band saw. It has extra speed through its extreme rigidity and saw support, allowing more feet per minute in saw travel. The set-up is quick, the cutting action continuous. It's accurate, insuring square true cuts. Operates and shuts off automatically. Model J, 10" x 18" capacity.

Also JUNIOR MODEL B,
5" x 10" capacity.

JOHNSON METAL CUT-OFF BAND SAW



Model J



JOHNSON MANUFACTURING CORP.
ALBION, MICHIGAN

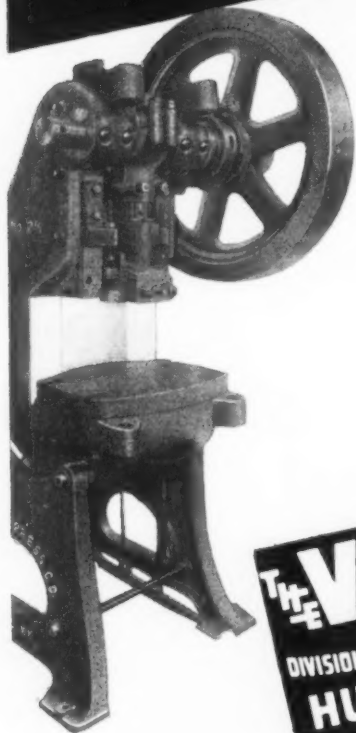
Separating Steel Sheets. The difficulties of separating steel sheets from one another when they are in stacks and are to be fed to a press are well known and they are also a great source of problem. The tendency for the sheets to stick together is frequently increased by coatings of oil and other preservatives and the tendency to stick is particularly noticeable with iron sheet that has been electrolytically tinned. Fan-

ning the edges of the sheets to give a sloping effect and the blowing of air blasts on the edges of the stack have not really offered solutions to the problem of how to separate steel and iron sheets easily.

A new approach to the problem has been made by James Neill & Co. (Sheffield) Ltd., who are well known as makers of magnetic chucks and other magnetic appliances. They have found that

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by arranging magnets at the edges of a stack of sheets the sheets will automatically separate from one another. This is due to the fact that the sheets are magnetized and the adjacent parts of any two sheets are of similar polarity and therefore repel each other and cause the sheets to separate. Experience has shown that steel sheets up to 0.80 per cent carbon content do not suffer in any way from the effects of residual magnetism and that the residual mag-

netism is not sufficient to cause any problem during subsequent operations. Apart from its use on rectangular sheets this principle can be employed for stampings of irregular form and the use of four permanent magnets in one set up enabled steel sheets of 16 gauge and weighing 5 lb. each to be separated from one another in spite of the fact that they were covered with a thick coating of a rust preventative oil.

A Special Report
by the editors of
Machine and Tool
Blue Book

REPORT NUMBER 4

Milling machines

KNEE TYPE, CONCLUDED
BENCH TYPE
HAND TYPE

This is the fourth in a series of special reports discussing particular types of machine tools. Included in this month's report on knee, hand, and bench type milling machines are:

1. a survey article on hand milling,
2. descriptions of late model milling machines,
3. series, models and specifications of American-made machines.

The three previous reports discussed: Thread Rolling, May; Power Press Brakes, June; Knee type Milling Machines, July.

Part 1. A Survey of Hand Milling

The first hand milling machines were really a small knee-type machine, with or without an overarm. The table was operated by a lever. For short cuts involving a fast feed this was considerably faster than the screw feed. However, a number of improvements have been made on many types of the original hand millers which has greatly increased their usefulness and opened a wider field of application.

The last war was responsible for developing new applications as well as encouraging the development of hand millers to accommodate these parts. The war required large volume production of small parts for the communications, electronics, and other small parts fields. The use of large machines was costly from the labor and production time standpoint, and because of the expense of making expensive fixtures and holding devices for these parts. Too frequently it was found that the larger machines were

unable to produce the parts as quickly as they were needed. A machine which was ideally suited for small, precision parts production was the hand miller, and as a result of their use during the war they have found an ever wider use in industry.

It is difficult to discuss hand millers generally; all models on the market today have their peculiarities, their advantages and their special applications. One thing they all have in common is the multitude of jobs which can be handled. Figure 1 shows a variety of parts which have been produced on H. B. Rouse hand millers.

The hand miller with standard workholding devices can turn out tremendous quantities of work if large production is necessary. On the other hand, the hand miller is ideal for small lot operations. As few as 25 pieces a day can be turned out. The low cost of the machine minimizes the cost of the time during which it is idle. In

other words, an inexpensive set-up can be made on a hand miller, the small lot run off, and the hand miller left standing idle until the next lot at relatively low cost as compared to the cost of idle time of a large standard machine.

Most of the manufacturers supply a large variety of attachments and accessories as do the manufacturers of large machines. The attachments can be had at relatively low cost and greatly increased the versatility of the hand miller. There are a number of types of hand millers available today: production, standard, tool room, and high speed. They vary in cost, size, and application; and the specific job to be performed will largely determine the type of machine.

There are few materials which cannot be handled with a hand miller.

Aluminum, brass, steel, iron, plastic, and copper can all be machined with equal ease. The average machines employ a high speed steel milling cutter which has proved successful on the majority of applications. Very little use has been made of carbides, due primarily to the high speeds required for carbide milling.

The lever operated table makes it possible to take milling cuts as fast as the piece can be locked and the lever moved. The spindles on hand millers are adaptable usually for small circular milling cutters or small end mills. On pedestal type hand millers, reaming, drilling, boring, and other operations can be performed. Figure 2 shows an interesting application of the Rouse hand miller. In this manufacturer's miller the lever controls the vertical spindle movement and it operates

Fig. 1. A representative collection of parts produced on a hand miller. The parts are aluminum, bronze, steel and plastic.

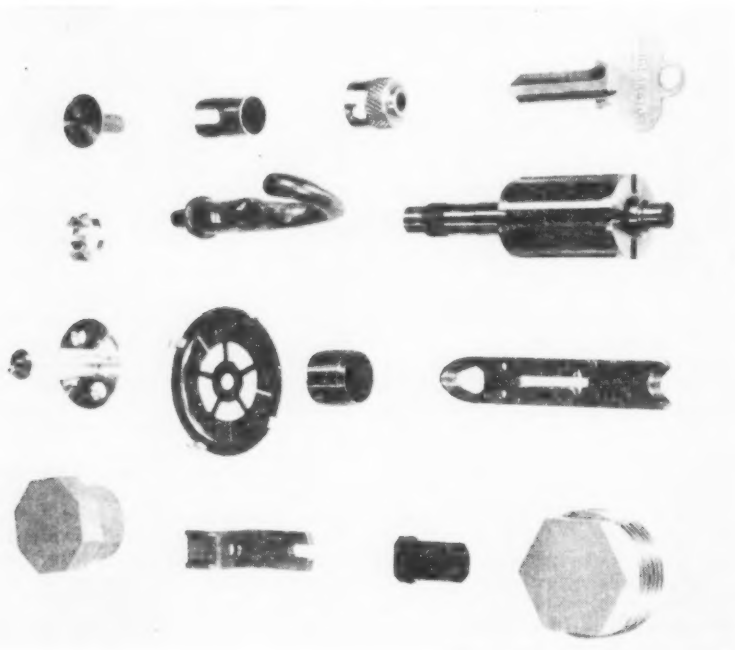




Fig. 1. A representative collection of parts produced on a hand miller. The parts are aluminum, bronze, steel and plastic.

pretty much like a cutoff machine on this particular application. Collet hold set-ups and vises as well as special sliding tables and indexing fixtures can be attached to the V-ways, thus providing also a longitudinal movement and if required, a transverse movement of the table. However, the interesting thing of figure 2 is the hydraulic attachment which operates the spindle movement. A brass bar is pushed through a vise until it contacts a stop. The operator operates the hydraulic unit and a piece of $\frac{3}{8}$ " sq. x 1" piece of brass is cut off. Production is pretty high on this installation.

Another air actuated machine is shown in figure 3. This miller is made only in the bench model. Yet it per-

forms accurate work. On the brass bar cutoff operation described in figure 2, a subsequent operation was needed

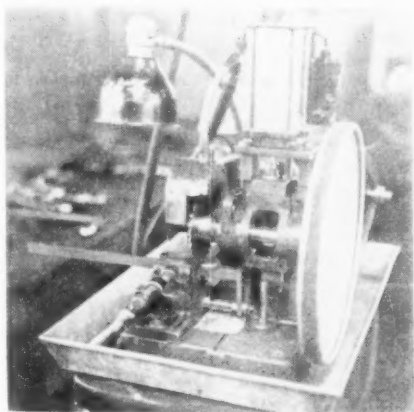


Fig. 2. Use of hydraulic unit to actuate the spindle on a cut-off operation on brass.

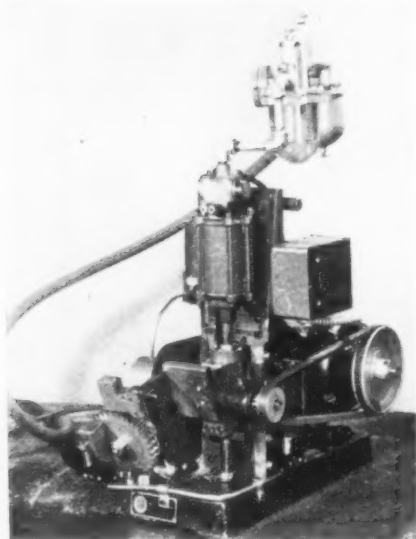


Fig. 3 Another application of air with use on a hand miller. Both millers are made by H. B. Rouse.

to cut a slot 1" long and $\frac{1}{4}$ " deep. This slot was held to .020". Another operation on brass involved a straddle milling operation. Both of these operations point out the accuracies of which this particular hand miller is possible.

The hand miller manufactured by the Nichols-Morris Company employs a rise and fall spindle, figure 4. The spindle on the Nichols-Morris' standard machine is bored full 1" diameter for its entire length. A minimum wall thickness in the bearing is $\frac{1}{2}$ ". As a result of this construction chucks, face plates, and fixtures can be adapted to the spindle without introducing deflection or strain, thus encouraging use of the machine lathe-fashion for primary and secondary operations. The spindle carries a heavy fly-wheel to insure smooth, accurate cutting. While lever longitudinal table feed is standard, a micrometer screw feed is available.

For jig boring work the "spotting drill" is mounted on the spindle horizontally and the job performed similar

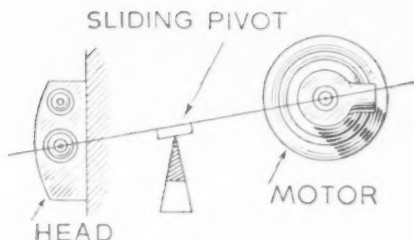
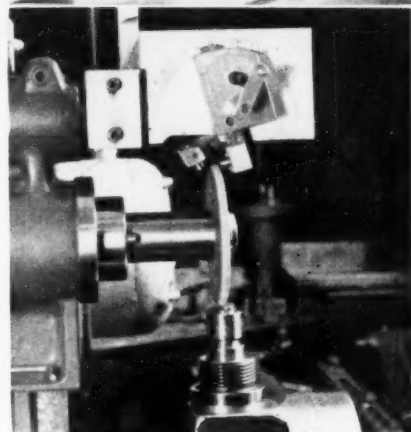
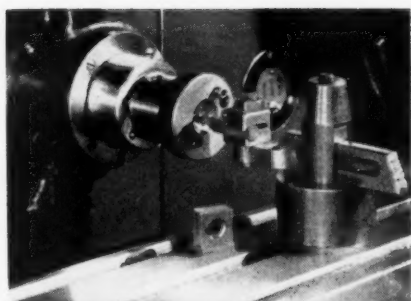
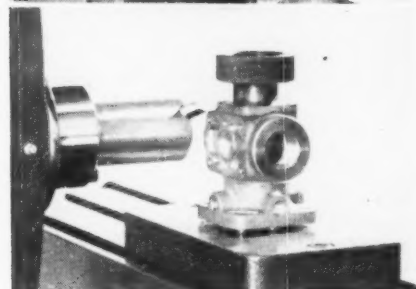
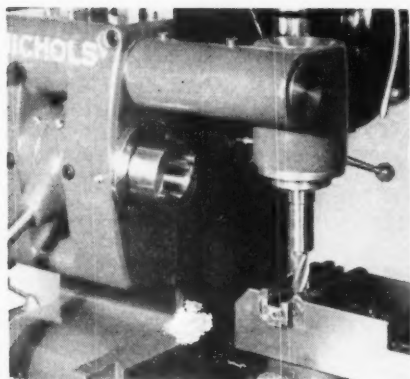


Fig. 4. Rise-and-fall spindle construction of the Nichols-Morris hand miller.

to the large horizontal jig borer. Spindle permits swinging the work lathe-fashion up to 24" in diameter, the tool being mounted on the table. Pictures 5, 6, 7, and 8 will give a pretty good idea of the types of work handled by the Nichol's hand miller.

These hand millers can be quickly adapted to 2-spindle operations, either in double-decker or opposed spindle fashions. Where simultaneous action of a two cutter spindle is practical, the machines are generally of standard construction except for the spindle and electrical equipment. They may be equipped with hand or pneumatic table feed. A double-decker spindle arrangement is shown in operation in figure 9. The part being machined is bronze bushing halves, S. A. E. 64, the cutter a Brown & Sharpe, $\frac{1}{8}$ " wide, 6" slot. The production on this double-decker is 600 halves per hour. Finished parts are shown in figure 10.

Another interesting installation is shown in figure 11. The U. S.-Burke Machine Tool Company also produces a double-decker machine. It was designed primarily for cutting opposed Woodruff keyways in steel tubing. The work piece is loaded into the air collet vise by placing it in a loading V-block and pushing it against a stop mounted behind the vise. The cutter revolves in opposite directions. The head of the machine is lowered to cut the top keyway and raised to cut the lower keyway. Stops are provided so that each keyway will be the proper depth. The operation is manual and much faster

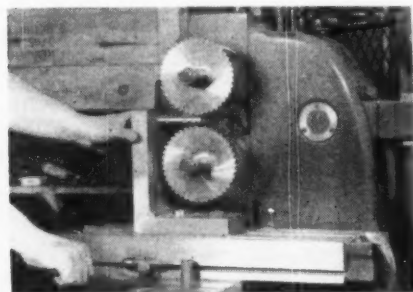


Figs. 5, 6, 7, and 8. Various machining operations being performed on Nichols-Morris hand millers: drilling, boring, turning, grinding.

than previous methods.

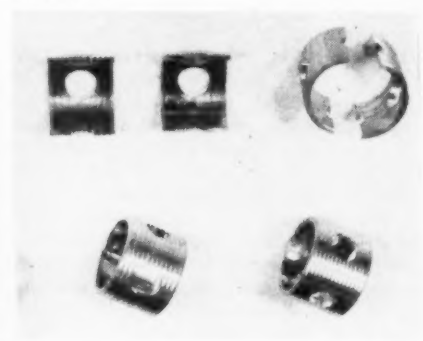
On another Woodruff keyway cutting operation, a U. S.-Burke miller is equipped with a combination air hy-

Fig. 9. Double-decker spindle arrangement machining bronze bushing halves at the rate of 600 halves per hour.



draulic head feed. This enables the machine to perform other operations besides keyway cutting. The head feed is adjustable for depth of cut, approach,

Fig. 10. Closeup of the bronze bushing halves.



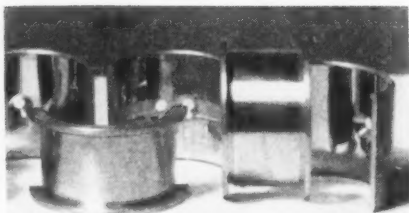
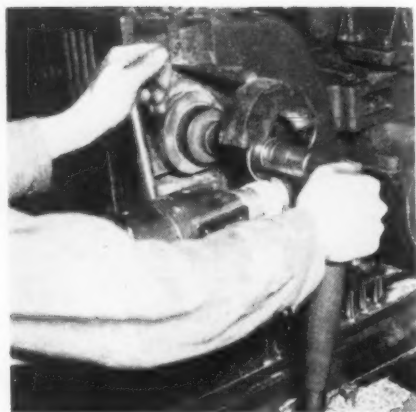


Fig. 11. Milling bronze babbitts on a horizontal machine using slitting saws. Production is 500 pieces per hour.



and return. On another machine, besides providing a rapid advance and control cutting speed and travel, an automatic controlled return is provided by an independent hydraulic system. The hydraulic unit is powered by a 1 h.p. drive motor for maximum productivity for small, light work. Fixtures may be mounted on opposite ends of the table. After the cutter is fed into the work piece the operator loads the other fixture. After the first cut has been made, the hydraulic cylinder reverses the direction of the table travel and the piece held in the second fixture is climb milled. By reloading each fixture independently it is possible to mill continuously without stopping the machine.

Much more can be said about hand millers, but we believe enough has been said to indicate that today the hand miller is, indeed, a versatile machine tool which has its proper place in the production scheme. Manufacturers of this equipment are glad to assist in the solution of milling problems.

Part 2. Description of late model knee, hand and bench milling machines.

Van Norman Ram Type Machines

The model No. 12, made by Van Norman Co., Springfield, Mass., has a saddle, 21" in length. Table feed mechanism is driven by worm and gear; feed is either by hand or automatic. Table is 37½" long by 9-3/16".

Cutter head is adjustable to any angle between its vertical and horizontal positions. Taper roller bearings are mounted at each end of the spindle. Spindle is hollow throughout its length.

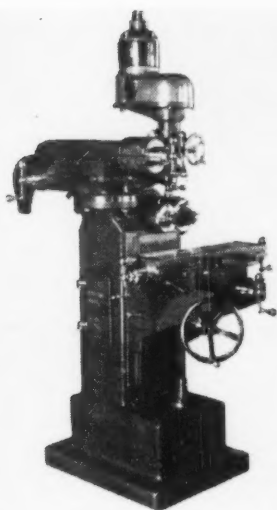
Machine can mill flat surfaces, vertical, horizontal, or any angle between, throughout the full range of the table.

Enclosed gears, chains and belts provide safe operation. Electric interlock between ram motor and feed motor

insures protection against strain on machine. A coolant reservoir is built into the base of the column with a capacity of 6½ gallons.

Fray No. 7-BH Ram type Universal

This Vertical and Horizontal Milling Machine was designed by the Fray Machine Tool Co., 515 W. Windsor Rd., Glendale, Cal., for shops requiring flexibility and precision. Without changing the set-up, machining operations with the miller can be done at any angle in either or both the vertical and horizontal planes. By traversing the ram on the turret slide, or by operating the ram in its saddle, all milling, drilling, or boring operations are



possible at any desired angle.

Vertical and horizontal milling can be accomplished as separate operations, and with the proper tools and set-up, both operations can be done at the same time. The triple features of the turret assembly permit extended ram adjustment, as well as desired positioning of the ram on the longitudinal ways. The entire turret can be rotated 360°.

The ram on the Fray No. 7-BH is operated by means of a ball crank on the end of the feed screw. This screw is mounted on ball and roller bearings for accurate and smooth travel.

U.S. Machine Tool Co's. No. 1

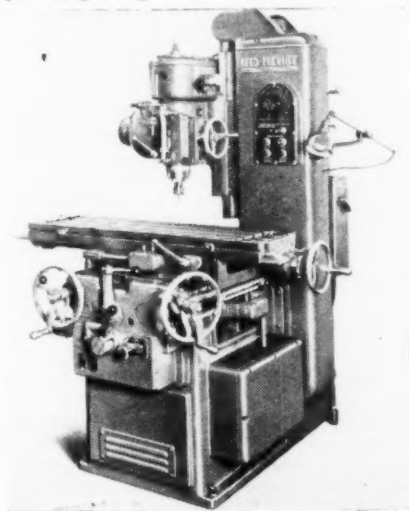
The No. 1 Milling Machine made by the United States Mach. Tool Co., Cincinnati 16, O., features a new hydraulic feed for high-speed semi-automatic production. The automatic pneumatic table provides rapid approach, adjustable feed and automatic rapid return. Extremely smooth cut is achieved by the air cylinder operating against the hydro check valve.

Machine has 18 full inches of longitudinal table travel; the speed of table travel is adjustable in both directions. The cutting speed is infinitely adjustable.

The new air-hydraulic No. 1. U.S. Milling Machine can easily be adapted for hook (or climb) milling and can be furnished with an automatic rotary feed table.

Reed-Prentice No. 12V

The V-12, made by Reed-Prentice Corp., Worcester, Mass., universal Head Milling Machine is a die sinking machine. The quill type milling and boring head is mounted on an adjustable ram. The head has a tilting arrangement which allows milling at all angles with 45° front and back and within 30° left and right of vertical. Horizontal milling with arbor is also possible. Head and transmission are mounted on a sliding ram to increase operating range.

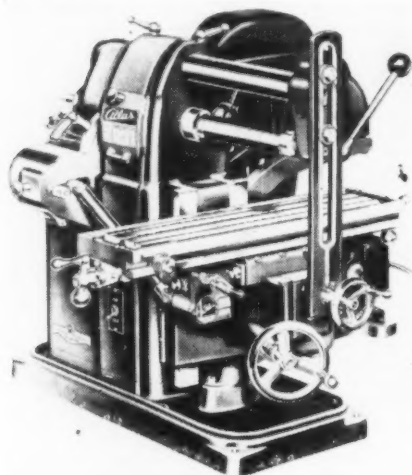


Electronic feed drive provides a feed range of approximately 100 to 1, from 1/4" to 24" per minute for table and saddle and from 5/32" to 16" per minute for the ram. The electronic unit is of the constant torque, half wave rectification type and has current limiting, dynamic braking and no-voltage release circuits.

Extra long table is of heavily ribbed construction. Dimensions are 46" long x 12" wide. Extra long bearing of table on the cross slide prevents excessive overhang.

Atlas Bench Miller

The Atlas miller made by Atlas Press Co., 2025 N. Pitcher St., Kalamazoo, Mich. handles the full range of milling operations from slabbing and facing to light end milling, keyways, finishing and layout work—accurately, efficiently and with dependable precision. Three types of table controls are available: hand-operated screw feed, rapid-production lever feed, and the new "Change-omatic" for instant selection

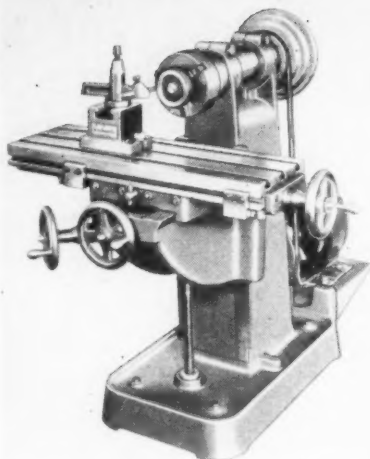


of automatic table feeds. A wide range of spindle speeds provides correct surface speeds for all types of work and cutters. Swivel vise, rotary index table, indexing centers, and coolant system are available.

Condensed Specifications: Table working surface $4\frac{1}{2}$ " x 18"; longitudinal table travel 12" (10" with "Changeomatic"); vertical table travel 6"; arbor diameter $\frac{7}{8}$ "; overall dimensions $25\frac{1}{2}$ " x $32\frac{1}{2}$ " x 22" high; motor recommended $\frac{1}{3}$ HP 1740 RPM; Timken tapered roller bearings for spindle.

Benchmaster Milling Machine

The Benchmaster miller, made by the Benchmaster Mfg. Co., West Pico Blvd., Los Angeles, Cal., is designed for small work. It possesses a long table travel, vertical table travel and transverse adjustment.



The machine can be used as vertical, or horizontal miller, grinder, drill press, or lathe. Spindle holds a No. 2 Morse Taper. $\frac{3}{8}$ " hole through spindle is mounted in Timken bearings. Bearing recesses and dovetails are carefully machined. Surfaces are precision ground. Either horizontal or vertical spindle assembly can be used.

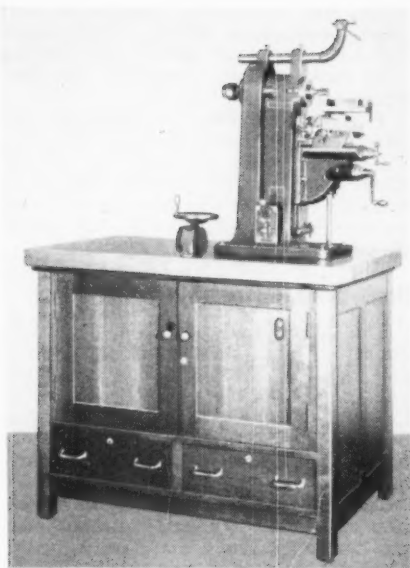
The head handles smallest end mills up to large diameter fly cutters for facing operations. A complete line of accessories are available.

Pratt & Whitney Bench Miller

This bench miller, made by Pratt & Whitney, Div. Niles-Bement-Pond Co., West Hartford, Conn., was designed primarily for precision work in tool rooms and experimental departments. It is ideal for milling small parts in tool, gage and model work.

It is designed and constructed to stay extremely rigid in operation and is capable of turning out work equal to that being turned out on floor models, within the limitations of the machine. By means of a wide variety of special attachments, it is possible to cover a large variety of milling cuts.

The No. 3 model C bench miller is the companion piece to the Pratt & Whitney 7" model C bench lathe. Parts from both machines are interchangeable.



able. The variable speed unit is mounted underneath. The remote control for selecting speeds is located to the left of the machine.

Micrometer dials are graduated to .001" and suitable binders are provided for both knee and saddle movements. All dovetails are equipped with adjustable gibs to compensate for wear.

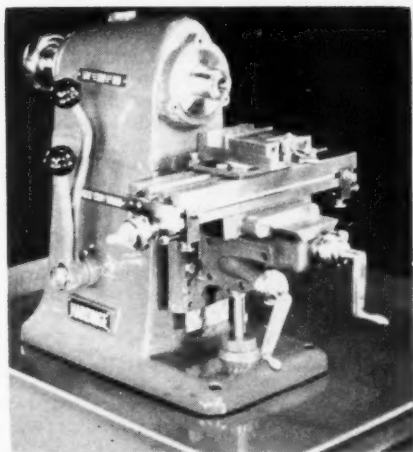
Hardinge BB4

Model BB4, made by Hardinge Bros., Inc., Elmira, N.Y., is a precision, bench type milling machine for production, tool room milling and experimental work. Headstock frame is heat-treated alloy iron and has hand scraped bearing surface.

Feature is the connected bearing. Enclosed headstock assures greater accuracy, allows heavier cuts, permits higher spindle speeds. Spindle is hardened and ground. It is mounted in rotating members to eliminate wear on spindle.

Work load on a sleeve bearing is supported by a film of oil.

Collets interchange between the cutter headstock and index head. Adjustable stops provided for longitudinal, transverse and vertical travel. All feed

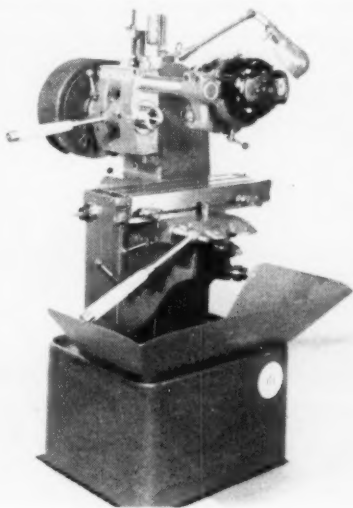


screws revolve in long, adjustable bronze nuts.

Working capacity is 12" x 3-3 16". Table travel is 5" longitudinal, 3 1/8" transverse, 5" vertical.

Nichols-Morris Standard Hand Miller

The standard Nichols-Morris miller, made by the Nichols-Morris Corp., 50 Church St., New York, is a manually operated, horizontal type precision milling machine. In addition to the



conventional movements of the table, saddle and knee, the spindle is mounted in a counter-balanced sliding head which allows the cutter to be brought to the work, as in sinking a Woodruff keyseat. The rise-and-fall spindle offers a great variety of uses.

Millers are available in several models: tool room, standard, high speed production. Production to tolerances in "tenths" can be attained. All sliding movements are hand-scraped to precise limits. Spindle is mounted in large precision bearings and carries a heavy flywheel driving pulley to assure smooth, accurate cutting. Lever longitudinal table feed is standard, but micrometer screw feed is available. The transverse and knee elevating screws are equipped with adjustable micrometer dials.

Rouse Hand Miller

This hand miller, made by the H. B. Rouse Co., 2214 N. Wayne Ave., Chicago, Ill., is used extensively in airplane plants, on instruments and ordnance parts. It can be used in finishing small parts for radios, electric motors, communications equipment, etc.

The spindle is adaptable for either small circular milling cutters or small end mills. Through the use of special fixtures developed for each particular

piece, the machine is capable of high speed production. Miller is high speed, ball bearing, motor driven for handling light cuts in brass, aluminum and similar materials.

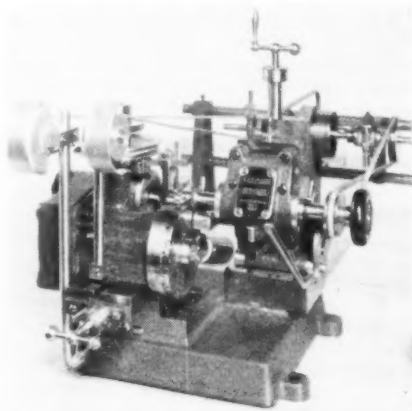
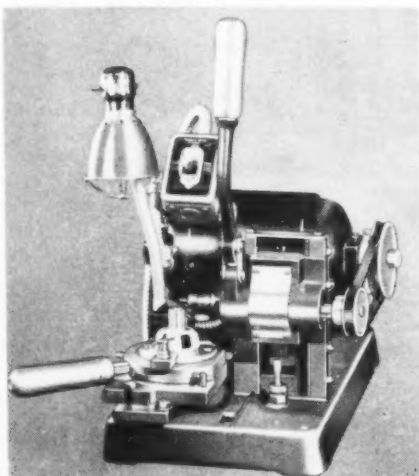
The cutter arbor is mounted between two substantial ball bearings. The arbor slide operates in an adjustable V gib. By pulling the handle towards him the operator controls the vertical movement of the cutter through its 3 $\frac{3}{8}$ " travel.

Derbyshire Micromills

The Micromill No. 750-C (cam-operated), No. 750-R (rack and pinion) and the No. 750-M (either cam, rack and pinion or screw-feed, but with longer work table to take an indexing head and tailstock). These models may be had with either vertical or horizontal heads.

The Micromills are built for precision and durability, and the ball bearing headstock has a standard accuracy of .0002" and will operate to spindle speeds of 12,000 RPM.

The Micromill was originally designed for Time Fuse Work for the Frankford Arsenal, and also for milling



operations 1-2-3 on the Escapement Lever, milling flats (both sides) on the Escapement Arbor, and performing the two operations required—milling and slitting—on the Escapement Block.

However, the machine has now been

developed so that it is adaptable to various milling operations, and can be used as a high speed grinder as well as a miller.

Work is hand fed by either cam action or rack and pinion operation on the table and vertical slides. A screw adjustment is provided on all slides.

Special fixtures are made when requested, two of which are the Rotary Fixture (shown in the illustration), and the Circular Work Table with Rocker Fixture.

The geared Rotary Fixture has a special 12-station work holder, and an air ejector to eliminate chips when milling stock or cutting fine saw slots. The Circular Work Table, mounted on the Rocker Fixture was designed to hold a small escapement lever.

The use of a 1/4 HP Motor, 1725 RPM is recommended for milling operations, and a 1/4 HP, 3450 RPM, for the grinding operations.

Kent-Owens Model 2RV

This machine, made by the Kent-Owens Co., Toledo, O., has a conventional hand lever feed to both the table and the head. It is designed for day-in and day-out production.

Simple variable speed drive and wide adjustments provide unusual range and flexibility. Large parts are easily milled. Either small or large parts can be run economically.

Table and head have adjustable stops which can be set to permit any desired travel within the total range. Spindle is mounted on Timken precision bearings, front and rear. Motor drive is from a three horsepower, 1200 RPM ball bearing motor.

Smooth, continuous speed adjustment from 100 to 300 RPM and from 400 to 1200 RPM by crank at front of machine. Interchanging of spindle and backshaft pulley shifts from one speed range to the other.

Part 3. Specifications of knee, hand, and bench-type milling machines built in America (Other knee-type machines were featured in the July issue.)

Pratt & Whitney		Charter Oak Blvd., West Hartford 1, Conn.			
Size and Model Type	H.P.	Working Capacity	Speed Range (RPM)	Speed Range (IPM)	Travel Capacity L=Longitudinal V=Vertical C=Cross VH=Vertical Head
Universal No. 3 Model C	2 speed motor 1/4 to 1/2	18" x 2 1/4"	125 to 2250		L=9 1/2"; V=8 7/8"; C=3 3/8"

H. B. Rouse & Co.		Chicago, Ill.			
Size and Model Type	H.P.	Working Capacity	Speed Range (RPM)	Feed Range (IPM)	Stroke
Hand Model	1/4	17 1/2" x 9"	850 or 3500	Hand	3 1/2"

Sliding table, indexing fixture, vise, round table surface, flat set-up, collet holding set-up, and collet holding unit, are available for use with the Rouse millers.

Kent-Owens Machine Co. Toledo, Ohio					
Size and Type Model	H.P.	Working Capacity	Speed Range	Feed Range	Travel Capacity L=Longitudinal V=Vertical C=Cross
No. 2RV Hand	3	28" x 10"	100 to 300 and 400 to 1200	Hand	L=21"; V=17 1/2"; C=6 1/4"

F. W. Derbyshire, Inc.**Waltham 54, Massachusetts**

Size and Model Type	H.P.	Working Capacity	Speed Range (RPM)	Feed Range (IPM)	Travel Capacity L=Longitudinal V=Vertical C=Cross VH=Vertical Head
Plain 750-C	$\frac{1}{4}$	7 $\frac{7}{8}$ " x 2 $\frac{3}{8}$ "	12,000	hand feed	L=3.15" V=2.71" C=1.26" with VH=same cap. as above
750-R	Do	Do	Do	hand feed	same as No. 750-C
750-M	Do	12" x 2 $\frac{3}{8}$ "	Do	hand feed	L=6.50" V=2.71" C=1.26" with VH=same cap. as above

Hordinge Brothers, Inc., Elmira, New York

Size and Model Type	H.P.	Working Capacity	Speed Range (RPM)	Feed Range (IPM)	Travel Capacity L=Longitudinal V=Vertical C=Cross VH=Vertical Head
Plain BB4-TM	$\frac{1}{4}$	12" x 3 $\frac{1}{2}$ "	180 to 3000	Hand	L=5", V=5", C=3 $\frac{1}{4}$ "
Universal UM	$\frac{1}{4}$	20 $\frac{1}{4}$ " x 6 $\frac{1}{2}$ "	110 to 1850	$\frac{1}{4}$ " to 13"	L=14", V=13 $\frac{1}{4}$ ", C=5 $\frac{1}{2}$ "
Vertical BB2V	$\frac{1}{4}$	12" x 3 $\frac{1}{2}$ "	300 to 5000	Hand	L=5", V=5", C=3 $\frac{1}{4}$ "

Benchmaster Manufacturing Co., 2952 W. Pico Blvd., Los Angeles, Calif.

Size and Model Type	H.P.	Working Capacity	Speed Range (RPM)	Travel Capacity L=Longitudinal V=Vertical C=Cross VH=Vertical Head
Plain No. 1-MH-1 (Horizontal) Hand Screw	1/3 - $\frac{1}{2}$	6" x 18"	450, 850, 1400, 2100	L=12 $\frac{1}{2}$ " V=9 $\frac{1}{2}$ " C=5 $\frac{1}{2}$ " Vert. Head Available. No Travel
Horiz. Prod. No. 1-MH-3	1/3 - $\frac{1}{2}$	6" x 18"	450, 850, 1400, 2100	L=12 $\frac{1}{2}$ " V=9 $\frac{1}{2}$ " C=5 $\frac{1}{2}$ " Vert. Head Available. No Travel
Vertical No. 1-MV-1 Hand Screw	1/3 - $\frac{1}{2}$	6" x 18"	450, 850, 1400, 2100	L=12 $\frac{1}{2}$ " V=8 $\frac{1}{2}$ " C=5 $\frac{1}{2}$ " Horiz. Head Available.
Vert. Prod. No. 1-MV-2	1/3 - $\frac{1}{2}$	6" x 18"	450, 850, 1400, 2100	L=12 $\frac{1}{2}$ " V=8 $\frac{1}{2}$ " C=5 $\frac{1}{2}$ " Horiz. Head Available.

Fray Machine Tool Company
515 W. Windsor Road, Glendale 4, Calif.

Size and Model Type	H.P.	Working Capacity	Speed Range (RPM)	Travel Capacity L=Longitudinal V=Vertical C=Cross VH=Vertical Head
Universal No. 1-7BH 1800 RPM 1½ HP Vertical Universal Attachment or 1 H.P. 1200 RPM	1½ 1	Table 9" x 36"	150-6400 8-Speeds 100-4250 8-Speeds	L=22" Turret Cross Slide 10" Combined 32" V=17" C=8½" Ram Travel 10" Combined 18½" VH=3½" Maximum distance spindle to table 19"
No. 1-7B Same for Vertical Attachment	Same	9" x 36"	Same for Vertical Attachment	Same as above

Atlas Press Company, 2050 N. Pitcher St., Kalamazoo, Mich.

Size and Model Type	H.P.	Working Capacity	Speed Range (RPM)	Feed Range (IPM)	Travel Capacity L=Longitudinal V=Vertical C=Cross VH=Vertical Head
Plain No. 1-MFC	1/3 H.P.	4½" x 18" table working surface, with 6" vertical travel & 3½" cross table travel	8 spindle speeds—62 to 2870 RPM	20 table feeds: .003" to 11.250 per min.	L=10" V=6" C=3½"
Plain No. 2-MIC	1/3	4½" x 18" table working surface	8 spindle speeds—62 to 2870 RPM	Manual Controls	L=12" V=6" C=3½"
Plain No. 3-MHC	1/3	4½" x 18" table working surface 6" table travel, vertical	8 spindle speeds—62 to 2870 RPM	lever control	L=4½", 1 setting V=1½", per setting C=3½"

Reed-Prentice Corp.
Worcester, Mass.

Size and Model Type	H.P.	Feed Range (IPM)	Speed Range (RPM)	Working Capacity	Travel Capacity L=Longitudinal V=Vertical C=Cross VH=Vertical Head
Vertical 22-VS	3	1½" to 40"	900 to 2200 infinitely variable	32" x 22"	L=27"; V=16"; C=20" Universal head swivels 45°
22V	3		400 to 2600 with open belt 135 to 320 with back gears	32" x 22"	L=27"; V=16"; C=20" Ram adjustment=16" VH=5"
12V	3		90 to 2200 infinitely variable	46" x 12"	L=28"; V=14"; C=12" Ram adjustment=14" VH=5"

Nichols Morris Corp.

50 Church St., New York 7, N.Y.

Size and Model Type	H.P.	Working Capacity	Speed Range (RPM)	Table Travel L=Longitudinal C=Cross SM= Rise and Fall Spindle Movement V=Vertical	Remarks
Standard Pedestal model, Horizontal type	1	26" x 7"	100 to 1350 or 200 to 2700	L=10"; C=7"; SM=4½"; V=13"	Manual Operation Rise and Fall Spindle Heads
High Speed Pedestal model, Horizontal type	1	26" x 7"	250 to 3380	L=10"; C=7"; SM=4½"; V=13"	Manual Operation Rise and Fall Spindle Heads
Toolroom Pedestal model, Horizontal type	1	30" x 8½"	100 to 1350 or 200 to 2700	L=19"; C=7"; SM=4½"; V=13"	Manual Operation Rise and Fall Spindle Heads
Toolroom, High Speed model, Horizontal type	1	30" x 8½"	250 to 3380	L=19"; C=7"; SM=4½"; V=13"	Manual Operation Rise and Fall Spindle Heads
Semi-Automatic model, Horizontal type	1	26" x 7"	100 to 1350 or 200 to 2700	L=10" manual L=9" pneumatic C=7"; SM=4½"; V=13"	Manual and/or pneumatic longitudinal table feed
Two-Spindle Millers	Basically the same as standard millers. Rise and fall spindle head is replaced by stationary spindle heads. Heads are adjustable vertically. Feed usually is manual. Pneumatic feed can be supplied.				

U. S. Burke Machine Tool Co., Div. U. S. Machine Tool Co., Cincinnati, Ohio

Model, Size and Type	Specifications
No. 1 Production Hand Miller	Equipped with rack and pinion table feed.
No. 1 Tool Room Hand Miller	Same as above but equipped with hand screw feed table and micrometer dials graduated in .001".
No. 1 High Speed Hand Miller	Same as above. Spindle is equipped with oil lubricated Timken bearings. Machine provides maximum spindle speed of 3500 rpm.
No. 1 Burke Bench Miller	The above machines are floor-type hand millers. The cross feed and vertical feed is accomplished by means of screw feeds, with micrometer dials on each screw.
No. 1 Burke Bench Miller	Equipped with rack and pinion table feed, and rack and pinion vertical feed. This is a small production machine without overarm.
No. 1 Burke Bench Miller	Same as above. Has larger column and an overarm.

Elgin Tool Works, Inc.

1770 Berteau Ave., Chicago 13, Ill.

Size and Model Type	H.P.	Working Capacity	Speed Range (RPM)	Travel Capacity L=Longitudinal V=Vertical C=Cross VH=Vertical Head
HM-5C Plain Horizontal	¾-3/8	18" x 4½"	130-2500	L=12"; V=7"; C=6"
HM-5C Plain Auto. Cycle	Do	Do	Do	Do
VM-5 Vertical	1/6	18" x 4½"	400, 700, 1250, 2250, 4000	L=12"; V=7"; C=6"; VH=1½"

Van Norman Co.
Springfield, Mass.

Size and Model Type	H.P.	Working Capacity	Speed Range (RPM)	Feed Range (IPM)	Travel Capacity L=Longitudinal V=Vertical C=Cross VH=Vertical Head
Plain					
No. 2 Light	3	45" x 10"	30 to 1450	.5" to .36"	L=28"; V=16"; C=10"
No. 2 Medium	5	50" x 10"	30 to 1500	.5" to .36"	L=28"; V=17"; C=10"
No. 2 Heavy	7½	58" x 13"	30 to 1500	¾" to .32"	L=28"; V=17"; C=10"
Universal					
No. 2 Light	3	45" x 10"	30 to 1450	.5" to .36"	L=28"; V=16"; C=10"
No. 2 Medium	5	50" x 10"	30 to 1500	.5" to .36"	L=28"; V=17"; C=10"
No. 2 Heavy	7½	58" x 13"	30 to 1500	¾" to .32"	L=28"; V=17"; C=10"
Plain					
No. 3 Standard	7½	64" x 14"	25 to 1250	¾" to .32"	L=34"; V=17"; C=12"
Universal					
No. 3 Standard	7½	64" x 14"	25 to 1250	¾" to .32"	L=34"; V=17"; C=12"
No. 6 Ram Type	1	26¾" x 6⅞"	80 to 1450		L=18"; V=16½"; C=5¼"; R=9½"; Head adjustable 90°
No. 12 Ram Type Universal	1½	37½" x 9⅞"	70 to 1465	¾" to 14"	L=17"; V=12½"; C=6½"; R=12¼"; Head adjustable 90°
No. 16 Ram Type Plain and Universal	2	37" x 9½"	95 to 2000	.6" to 16"	L=18"; V=17"; C=8"; R=14"; Head adjustable 90°
No. 22L Ram Type Plain and Universal	3	45" x 10"	50 to 1400	.5" to 36" longitudinal	L=28"; V=17" for Plain and Universal, 18½" for Special Plain and Special Universal; C=10"; R=19"; Head adjustable 90°
No. 22M Ram Type Plain and Universal	3	50" x 16"	50 to 1400	.5" to 36" longitudinal	L=28"; V=20"; C=10"; R=19"; Head adjustable 90°
No. 26 Ram Type Plain and Universal	5	58" x 13"	30 to 1500	¾" to 32" longitudinal	L=28"; V=19"; C=12"; R=20"; Head adjustable 90°
No. 26 Ram Type Special Plain and Universal	Do	Do	Do	Do	Do
No. 36 Ram Type Plain and Universal	5	64" x 14"	Do	Do	L=35"; V=22¼"; C=12"; R=20"; Head adjustable 90°
No. 36 Ram Type Plain and Universal Special	Do	Do	Do	Do	Do
No. 38 Ram Type Plain and Universal	10	Do	55 to 2000	Do	Do
No. 38 Ram Type Plain and Universal Special	Do	Do	Do	Do	Do

MACHINE TOOL DIRECTORY

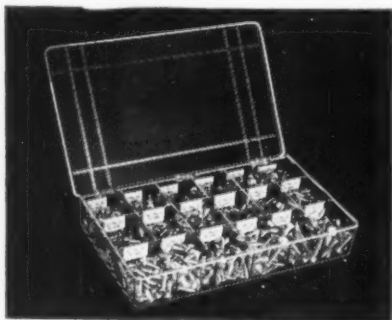
This is the fourth in a series of reports on American-built machine tools. Previously published reports dealt with Thread Rolling, Power Press Brakes, Knee-type Milling Machines. In preparation are reports on: Bed-type Milling Machines, Shapers, Screw Machines.

A few reprints of previously published reports are still available.

Bolt and Screw Assortments

The Acro Bolt & Screw Company, 3476 Gibson Ave., Detroit 1, Mich., is introducing various assortments of bolts, screws and set screws in attractive Lucite boxes for retail stores, machine and sheet metal shops.

A few of the twenty-odd assortments include: No. 101 Sheet Metal Screw Assortment which is made up of 18 different sizes from $\frac{3}{8}$ " No. 8 to 1" No. 14, a total of over 900 pieces; No. 104 U. S. (or S. A. E.) Hex Cap and Nut Assortment, consisting of 13 sizes of screws from $\frac{1}{4}$ " x $\frac{5}{8}$ " to $\frac{1}{2}$ " x $1\frac{1}{2}$ ", 150 pieces, plus 5 sizes of nuts, 110 pieces, a total of over 260 pieces; No. 107 Combination Machine and Wood Screw Assortment, comprising 6 sizes of wood screws, from No. 4 x $\frac{1}{2}$ " to 10 x $1\frac{1}{2}$ ", 240 pieces; 9 sizes of machine screws, from No. 8-32 x $\frac{1}{2}$ " to $\frac{1}{4}$ " x $1\frac{3}{4}$ ", 288 pieces; 3 sizes of nuts, to fit above, or a total of over 816 pieces.



Special assortments can be made to individual specifications.

Plastic-Type Floor Material

One minute after application of Swift-Floor, a new plastic-type floor material offered by The Monroe Co., 10703 Quebec Ave., Cleveland 6, Ohio, a 50,000-pound load can be trucked over it. Swift-Floor can be used either for patching wood or concrete floors, or for complete resurfacing of aisles, loading platforms, ramps, driveways, etc.

Swift-Floor has been used by factories, mills and transportation companies in their freight and general warehouses with excellent results. No experienced labor is necessary to apply it. A man can install Swift-Floor either with the tamper (which is supplied with the initial order for one drum) or by rolling.

Since the compound is set by compression, rather than by water evaporation, the more traffic that flows over it, and the heavier the load, the smoother and



harder and better the floor becomes. It actually improves with use. Application requires just a few minutes. It is packed in 55-gallon lever-top drums, ready to use. No mixing is required.

New Williams Construction Wrenches

With the introduction of 45° and 90° bent handle Construction Wrenches in both carbon and alloy steels, J. H. Williams & Co., 400 Vulcan St., Buffalo 7, N. Y., offers a complete range of sizes and styles in construction pattern wrenches.



The 45° and 90° bent handles facilitate work in close quarters where maximum accessibility and leverage are required. This type of wrench is particularly useful on flange and pipe line work in refineries, chemical plants and industries using processing equipment. Openings are from $\frac{7}{8}$ " to 2".



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Modern Tools in Action

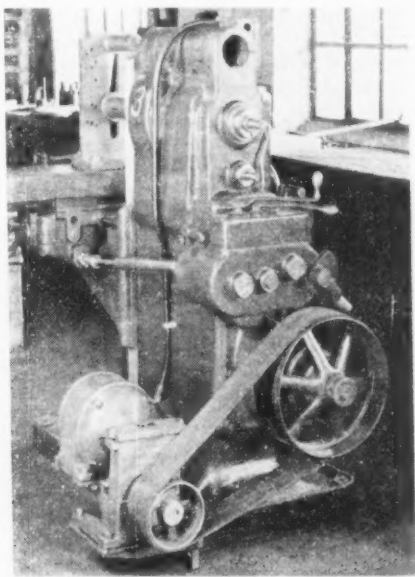
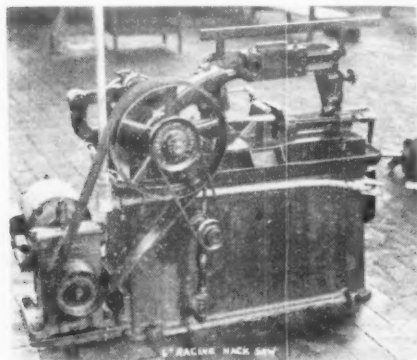
Compact Motor and Speed Reducer Unit Makes Larger Driving Pulley Possible

by Francis A. Westbrook

A type of drive which has proved highly satisfactory for certain types of individually motorized machine tools consists of a general purpose high speed induction motor with direct-connected speed reducer mounted as a unit on a single adjustable base. The principal advantage of such a unit is that it is practicable to use the highly efficient high speed induction motor and, due to the speed reducer, still be able to have a large enough driving pulley to avoid belt slippage even when driving to a much larger diameter pulley on the driven machine. The unit is also very compact.

The illustrations show applications to two different machine tools. The motors operate at 1725 r.p.m. and the reducers have a ratio of $3\frac{1}{2}$ to 1 so that

their output speed is approximately 621 r.p.m. A roller chain and sprocket drive running inside a dust proof casing constitutes the single reduction type of reducer. Where desirable a double reduction unit may be used which consists of a chain and sprockets for the first reduction, and helical gears for the second reduction. With these output speeds as low as 115 r.p.m. are ob-



tainable. Another double reduction type speed reducer using helical gears only may have an output speed of 31 r.p.m. with a 1725 r.p.m. motor. A wide range of speeds is possible by suitable selection of gears and sprockets.

The base consists of cold rolled steel shafting supporting the arms on which the drive is mounted. It is easily installed on most machines by drilling holes in the frames for pillow blocks so that the shaft will be level. Units range in size from one-half to ten horsepower and with speed reducing ratios up to 20:1. (Photos Cullman Wheel Co., Chicago.)

Broaching Parts of Different Metals

An interesting solution to finish machining different parts in relation to each other was recently worked out at The Underwood Corp., and Colonial Broach Co., of Detroit. In typewriter carriage guides, it is extremely impor-

tant that the V's on opposite sides line up accurately. To avoid chance of error in assembly, Underwood broaches these V's after assembly—even though one part is cast iron and the other steel. The metal indicated by the dark area in figure 1a is removed in the first broaching operation; then the steel bar is attached and the two V's broached as in figure 1b. The machine used is a 10 ton 72 inch stroke Colonial Universal Horizontal, with the double toothed broach guided the full length of its stroke in the broach towers, figure 2.

Interesting also is that the fixture is designed to accommodate carriage guides for two sizes of typewriter carriages—one guide being 14" and the other 26" long. Either size part is held in the fixture by cams, locating plungers and equalizing clamps.

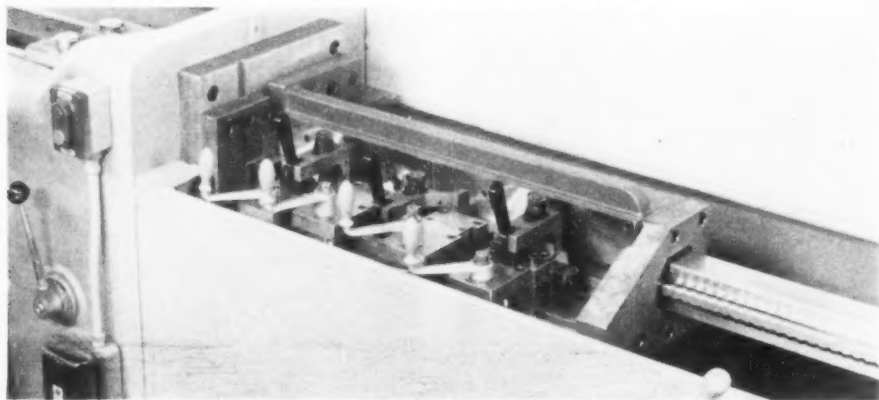
Incidentally, it was found that the same 'hook' could be used for the



Fig. 1. At left; figure 1a before assembly; at right; figure 1b after assembly. Cross section of typewriter carriage guides showing metal removed by broaching.

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Figure 2. Close-up showing broaching set-up.



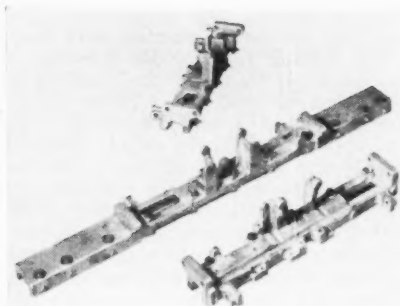


Fig. 3. Photo of finished carriage guides

broach teeth on both sides of the broach in this operation, thus simplifying broach grinding.

Prior to this final assembly and the broaching operations, the openings in the carriage guide are also broached to correct size and shape on another Colonial Horizontal, figure 3.

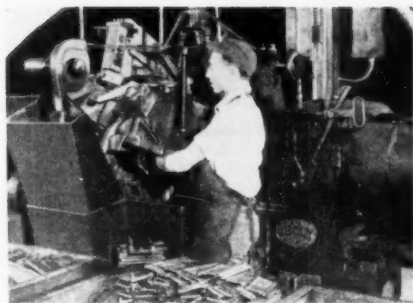
Grinding Increased from 200 to 800 Parts

A grinder newly installed in the foundry of American Wheelabrator and Equipment Corporation at Mishawaka, Ind., increased grinding capacity from 200 to 800 parts per hour. Grinder is a Charles H. Besly and Company's No. 218-23" double-spindle wet grinder.

Before the installation of the Besly grinder the blades of the Wheelabrator centrifugal abrasive blasting machine were ground individually at the approximate rate of 200 per hour. Today they are ground at the rate of 540 blades per hour, both ends of the blade in a single operation, and actual capacity is 800 blades per hour.

The base of this wet grinder is arranged for motor drive, with motors mounted on adjustable brackets attached to rear of spindle heads. Transmission is multiple V-belt, including belts, spindle sheaves, belt guards, welded steel water hood, motor driven coolant circulating pump with starter, settling tanks and piping.

Other features are a combination tie-bar and truing device, with single arm



With this new Besly grinder production was increased from 200 parts to 800 parts per hour.

for ball-bearing dresser and spring feed on spindles. Fewer spindle driving motors and starters are required.

The grinder is equipped with 2-23" steel disc wheel drilled and counter-bored for nut-inserted abrasive discs, and 2-23" x 2" x 8" Besly-Titan Steelbac abrasive discs.

The power driven rotary fixture is mounted on a bracket attached to the machine base, including factional horsepower motor and starter, vari-speed motor pulley and belt. The cable clamping arrangement includes tightener arm, idler and tightener sheaves, and bracket with two cables. Set spring loaded guide shrouds are attached to water hoods at the entrance to the grinding zone, arranged for hand feeding. Both shrouds have safety switches.

The multiple station feed wheel has ten hardened interchangeable work-seats around the periphery, designed to accommodate the Wheelabrator blade, including clamping arms to grind both ends. Fan-cooled, ball-bearing motors are entirely enclosed, as are the magnetic starters with separate push-button control.

Stainless Steel Fixture

The problem was to make a fixture for use in heat treating small parts. However, the high temperature operation, 1450° F. for one hour, ruined the steel tubing fixtures after 1 to 7 runs through the furnace. When it was possible to salvage the fixture, time was



A stainless steel fixture used in heat treating small parts.

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required for straightening. To overcome the problem the fixture was made out of type 314 stainless steel tubing thus increasing fixture life from 1 to 7 runs to over 500 runs. It is claimed that savings due to longer life and elimination of time required for straightening amounted to \$1500.00 per month.

Newly Painted Work Dries Alongside Exhaust from Unit Dust Collector

Positive control of dust from the production milling of decorative grooves in masonite sheet was achieved with a low-cost, unit type dust collector. Not only did the collector have to remove dust at its source, but had to clean the air of the dust and return it to the working space, with virtually 100% efficiency. This is because completed work, fresh from the paint room, is returned to the area where the milling is done. Any dust escaping from the dust collector, would therefore ruin the newly painted work.

Previously, the painted work was

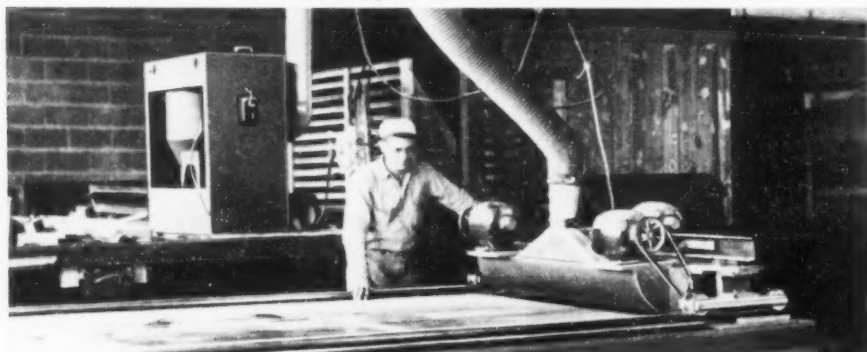
dried elsewhere, but after it was decided to change the production flow and bring the newly painted work back to the milling room while it dried, it was essential that the dust collecting equipment be installed without delay. This indicated a self-contained, unit type collector which could be obtained quickly and installed without extensive lay-out of piping, wall or roof cutting, etc. A dust collector obtained from Agat-Detroit Company, Ann Arbor, Michigan, together with a special hood to house the milling cutters, was installed.

The milling, routing or similar machining of tempered masonite, with even one cutter, always produces a considerable volume of very fine dust. In the present case, not one, but ten milling cutters are in simultaneous use. They are mounted on a carriage equally spaced over the 4' width of the sheet. The total travel of the cutters is approximately 10'.

To collect all of the dust thrown off from all of the cutters, a special hood was designed which could be fastened to the travelling carriage. The hood was located in such a manner as to be in direct line of the heavier dusts thrown off by the action of the cutters themselves. The dust collector, however, had to supply sufficient suction not only to convey the heavy dusts, but also to divert the direction of the finer dusts which tend to follow the periphery of the milling cutter.

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Painted work dries alongside exhaust from unit dust collector.



Special Process Cleans Inside of Cylinder Block

Through the application of a special process for the internal cleaning of engine blocks, Ford Motor Company has practically ruled out the possibility of engine trouble developing due to inadequate block cleaning, Logan Miller, general manager, Rouge Division, said.

The process employs a new shot blast cleaning machine that is the first of its kind in the automotive industry. It guarantees additional protection against core sand remaining in the internal cylinder block water passages.

The new pressure blast machine supplements conventional equipment now in use to remove burnt core and molding sand and scale from interior and exterior surfaces of the motor block casting.

Ford ultimately plans to equip each of the production foundry's motor block

cleaning systems with the new compressed air blast cabinets.

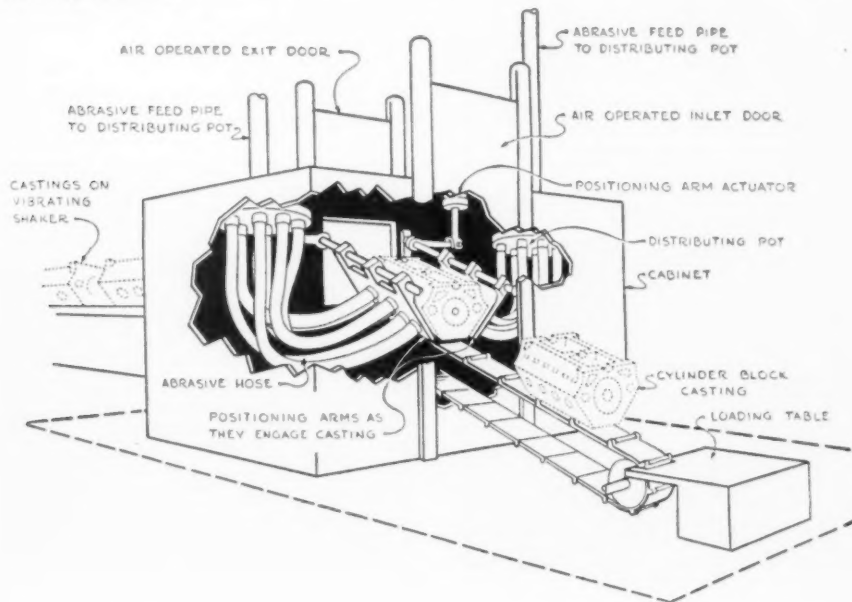
The installation provides the latest known means of insuring removal of core sand and foreign material left inside the block following casting.

Possibility of obstructions developing in water circulation, thereby creating faulty or broken cylinder blocks in cars during operation is minimized.

The new blasting technique works this way: Motor blocks to be blasted are brought by conveyor one at a time into the blast cabinet. Two work positioning arms, one for each side of the casting, register the block in correct position for applying the blast of shot. The blast is blown through sixteen nozzles under air pressure of 85 pounds per square inch.

The air-driven shot strikes hidden sand or scale, freeing it from the metal's

New process of cleaning the inside of cylinder blocks employs a new slot blast cleaning machine.



surface. The loosened material then can be removed from the block's interior.

Surfaces of the water jacket, crevices and thin sectional openings are blasted clean—exposing bright virgin metal to the cooling water circulated from the radiator.

The material used in the blast process consists of iron or steel shot and grit. The air blast equipment operates automatically, the blast period being controlled by an automatic timer.

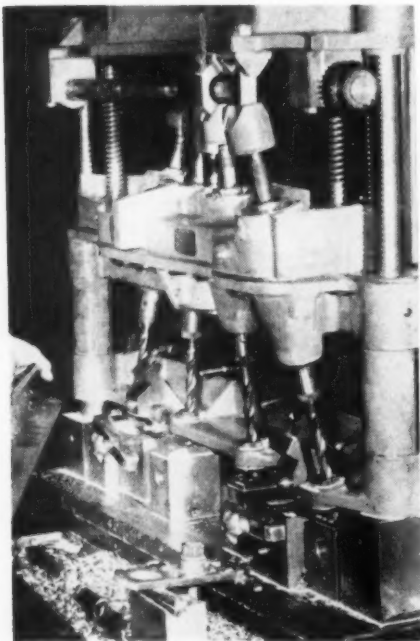
As a result of this efficient internal cleaning, water passages in the block are smooth and free from flow interferences and result in cooler operation of the engine, particularly at heavy loads.

Drill-Head Increases Production

This drill head is responsible for a 600% increase in production of torch

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Output jumps almost 600% with the use of a drill head on the drilling torch cone end tips.



cone end tips at the Victor Equipment Co., plant, San Francisco. The head, mounted on a seven-station full automatic drilling machine is drilling 61½" deep No. 45 holes in the work piece. The cyclical rate of the operation is 28 strokes in 1 minute and 10 seconds. Extreme flexibility of adjustment on the drill head permits this unit to be used on an endless variety of set-ups, thus giving the user an all purpose multiple hole drilling unit which serves every function. The unit was made by Commander Mfg Co., W. Kenzie St., Chicago, Ill.

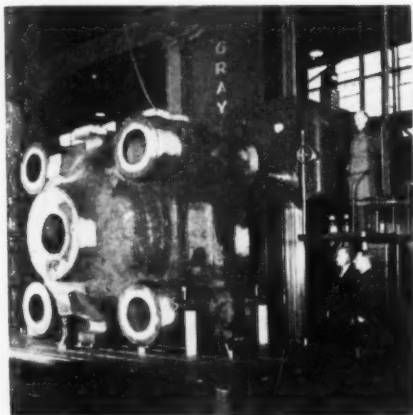
Planer-type Boring Mill

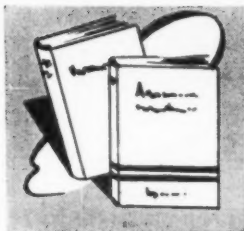
This giant 97,500 lb. cast steel cylinder for an H-P-M hydraulic press is being machined on one of the largest planer type boring mills ever built. This huge 8" bar type mill was installed in the plant of The Hydraulic Press Mfg. Co., recently, as a part of a tool modernizing program to broaden the scope of the company's manufacturing activities. Castings weighing up to 170,000 lbs. each are scheduled for this giant boring mill. The machine was built by the G. A. Gray Co., Cincinnati, Ohio.

In the foreground is Howard M. Hubbard, president, and E. V. Crane, chief engineer, of H-P-M.

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One of the largest planer-type boring mills ever built machining a 97,500 lb. cast steel cylinder.





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Available Literature

1. Wire Bar and Tube Drawing Dies for increased production, longer die life, fewer rejections, easier maintenance, are included in an attractive 4-page catalog with full specifications, the new size die nibs and standard casing dies, tolerances and other pertinent information. Request Bulletin D-749. **Adamas Carbide Corp.**, 998-B S. 4th St., Harrison, N. J.

2. Rodgers Hydraulic Shop Presses, from 60 to 400 tons capacity, are reviewed in an attractive 18-page, 3-color catalog; the complete line, including presses of 60, 80, 100, 150, 200, 300 and 400 tons capacity, as well as special shop presses, hydraulic hand and power pumps, with applications are included. Catalog No. 313 is available upon request to **Rodgers Hydraulic Inc.**, Minneapolis 16, Minn.

3. Bob-Cat Electric Cable Hoists, an 8-page, 3-color folder, well illustrated with photographs, diagrams and line drawings gives full descriptions, specifications, prices and ordering data on a new line of heavy-duty electric cable hoists. Catalog on request to **The Ohio Electric Manufacturing Co.**, Cleveland, Ohio.

4. Wales Notching Units for notching mild steel up to $\frac{1}{8}$ " thick are described in detail in a handsome new 4-color process catalog. These devices include template set-ups for use in stamping presses and press brakes, corner notching devices, radius notching units, edge notching units, and several other types, with complete specifications. Second edition of Catalog N is available upon request to **Wales-Strippit Corp.**, North Tonawanda, N. Y.

5. Industrial Tool Catalog, new 20-page well illustrated bulletin contains complete buying and application information on the Dumore line of tool-post grinders, hand-grinders, flexible shaft tools, high-

speed quills and high-speed drilling equipment. On-the-job photographs of cost-cutting tool set-ups, charts and instruction tables are included. Request catalog No. 50 from **The Dumore Co.**, Racine, Wis.

6. Solid Tungsten Carbide Drill Bushings are listed in a new bulletin detailing all information, including description of headless press fit, head press fit, fixed renewable and slip renewable types, all ground and lapped to exacting finish and precision dimensions, interchangeable with A.S.A. steel bushings. Request Bulletin No. 102. **S & E Machine Products, Inc.**, Bridgeport, Mich.

7. Hardinge 10" General Purpose Lathe is illustrated and described in a new, double-fold bulletin; such features as independent variable electric feed, precision gear box and lead screw, solid and hardened dovetail bed ways are discussed in detail, with excellent, clear illustrations, complete specifications, with optional spindle speed ranges. Bulletin HL sent on request. **Hardinge Brothers, Inc.**, Elmira, N. Y.

8. Herman Granite Surface Plates, featuring accurate surface, non-abrasive finish, non-magnetic durability, smooth action, temperature resisting, non-warping, rust and corrosion-proof, are discussed in a 4-page, illustrated folder giving complete specifications. Available upon request from **The Herman Stone Co.**, 324 Harries Bldg. Dayton 2, Ohio.

9. Buckeye Air Tools Catalog, revised and enlarged, containing helpful information for users of air tools. A complete line of pneumatic tools for a variety of operations in plant, maintenance department or tool room. Send for copy of this new catalog to **Buckeye Tools Corp.**, Division 14, Dayton 1, Ohio.

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CARBIDE-TIPPED CUTTING TOOLS

A COMPLETE LINE OF SINGLE AND MULTIPLE POINT CUTTING
TOOLS — EXPANSION REAMERS — FORM TOOLS — CENTERS —
MASONRY DRILLS — SPECIAL TOOLS

10. Balas Cam Ground Collets bear on the taper regardless of whether or not the stock runs true to size. Feature faster opening, tighter gripping, reduced chatter, less tendency to push back stock. Full story available in new Catalog and Price List. Write Balas Collet Manufacturing Co., 1561 27th St., Cleveland 14, Ohio.

11. Multiple Spindle Drillheads for conversion of standard single-spindle drilling machines into high production units for a variety of machining operations. Illustrated, 2-color, 20-page brochure in-

cludes complete information on the design detail and construction of over 50 models. Write for free copy to Thriftmaster Products Corp., 1004 N. Plum St., Lancaster, Pa.

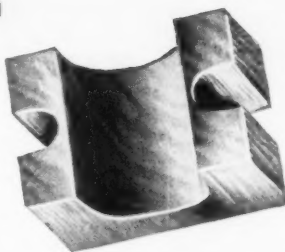
12. Segmental Grinding Chucks for vertical spindle surface and horizontal spindle face grinding; basic design of these chucks consists of the grinding segments placed in circular echelon overlap formation, cutting with a rapid sweeping action which throws out chips and dirt. New 4-page, illustrated bulletin contains full information, listing 12

'Specials'

can be

LESS

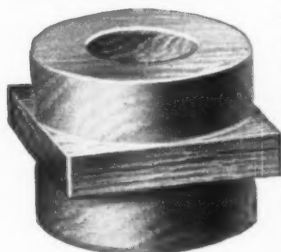
EXPENSIVE!



Yes, custom-designed wood bearings are more practical, less expensive in many applications where designers, due to cost considerations, are forced to 'squeeze' stock bearings. Important design values are lost in the adaptation to stock bearings—values that can be saved by using POBCO precision-made bearings.

We will be glad to match performance with any custom-designed bearing, to match cost with any stock bearing. Let us send you FREE samples for test purposes, precision-made to your exact specifications.

A further aid in solving your bearing problems is POBCO's "Design Data" Manual, just published. On loan to engineers and machine designers, it is available at your request.



Paramount Oilless Bearing Company, Inc.
99 Hope Ave., Worcester, Mass.

Please send me a copy of your new engineering manual, "Design Data."

Name.....

Company.....

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City & State.....

advantages of these tools. Abrasive Associates, 1216 Industrial Trust Bldg., Providence 3, R. I.

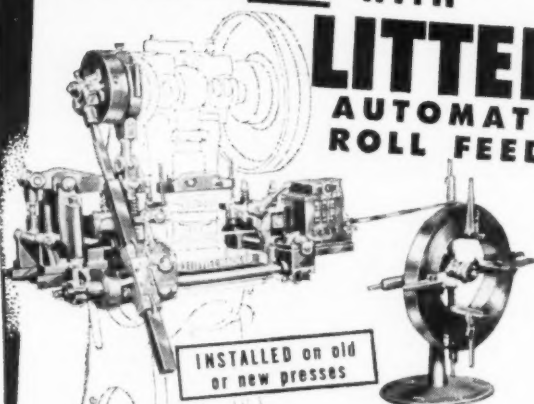
13. Taft-Peirce CompAirator Air Gage, a precision device for rapid, economical inspection at the bench, in the laboratory, or at the machine; easy operation, ultra sensitivity and high accuracy make this unit especially useful. Illustrated 16-page, 2-color catalog contains complete information, applications and gaging accessories. Available from The Taft-Peirce Manufacturing Co., Woonsocket, R. I.

14. Super Chrome Plated Holders of improved Ejector Tool design, are stated by their manufacturer to give up to 500% longer wear by eliminating chip erosion; new clamping method gives controlled locking and stress free carbide insert support. New 6-page Supplement No. 1 to Catalog No. 50 contains specifications and prices of six different types of holders. Super Tool Co., 21650 Hoover Road, Detroit 13, Mich.

15. Dovetail Type Boring Heads suitable for small jig borers, turret lathes and light milling machines have $\frac{1}{8}$ " to $\frac{1}{2}$ " bar capacity, $\frac{1}{2}$ " offset; the dovetail slide

**IT PAYS 5 WAYS TO FEED
PRESSES FAST WITH**

LITTELL AUTOMATIC ROLL FEEDS



INSTALLED on old
or new presses

1. **MORE PRODUCTION**... Littell automatic feeding can multiply output per press as much as 5 times.
2. **MORE ACCURACY**... Rack and pinion drive provides smoothness and the gradual acceleration and deceleration of feed rolls for a truly accurate feed.
3. **MORE SAFETY**... The recognized protection Littell automatic feeding provides means safety for operators and lowered insurance rates.
4. **MORE VERSATILITY**... Littell Automatic Feeds are made for all types and sizes of presses. Handle stock from .003" to .25" thick, from .5" to 55" wide. Special models handle stock up to 90" wide.
5. **MORE ECONOMY**... Higher output per press, lower cost per stamping, sustained efficiency and low maintenance cost have been outstanding Littell advantages since 1918.

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Catalog

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**LITTELL
MACHINE CO.**

ROLL FEEDS • DIAL FEEDS • STRAIGHTENING
MACHINES • REELS • AIR BLAST VALVES
4147 N. RAVENSWOOD AVE. • CHICAGO 13, ILL.

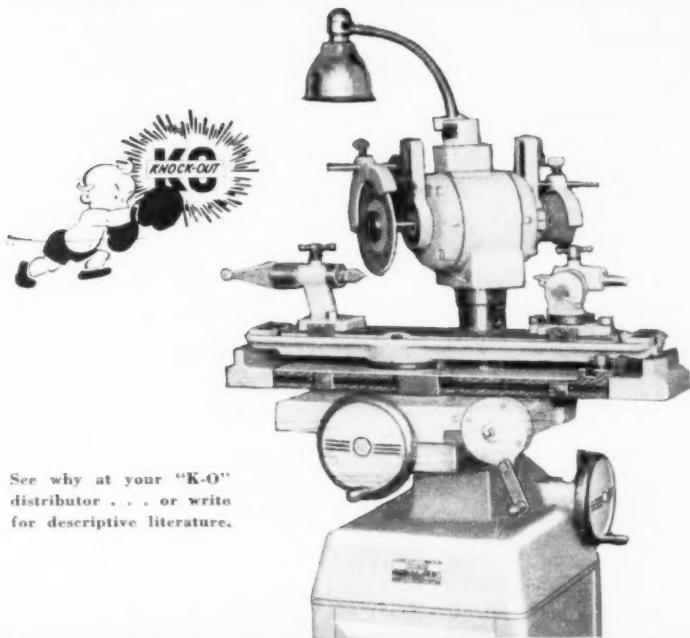
permits fast, accurate adjustment. New illustrated folder gives specifications and prices of two models, one-way and two-way types. Available from Flynn Manufacturing Co., 443 Bates St., Detroit 26, Michigan.

16. **Lindberg Sintering Furnaces** of four basic types—hand push batch type, mesh belt continuous type, mechanical pusher continuous, and roller hearth continuous type—are discussed in new 8-page, 2-color Bulletin No. 230; also included is information on proper atmosphere generators for use in conjunction with the

furnaces. **Lindberg Engineering Co.**, 2442 W. Hubbard St., Chicago 12, Ill.

17. **Wyco Flexible Shafts** and Flexible Shaft Equipment with patented quick-change straight hand pieces and angle heads which snap on and off. This innovation permits changing accessories for successive operations in seconds, from grinding to sanding, wire brushing to polishing, all on one machine, without loss of time. New 16-page Catalog No. 50 contains complete information on all Wyco shafts and accessories. **Wyzenbeek & Staff, Inc.**, 833 W. Hubbard St., Chicago 22, Ill.

**There's a reason... 85% of all
popularly-priced Tool and Cutter
Grinders sold are "Knock-outs"**



See why at your "K-O"
distributor . . . or write
for descriptive literature.

K. O. LEE CO.
ABERDEEN, SOUTH DAKOTA

18. **Pioneer Foot Switches** for use with drill presses, spot welders and similar pedal-operated machines speed up production by cutting time-wasting manual motions; coordinated foot operation by these devices leaves both hands free. Instant power shut-off reduces production costs. Illustrated circular gives complete data. **Pioneer Patents and Products Co., 25 N. Franklin St., Chicago 6, Ill.**

19. **Dualock Adjustable Thread Ring Gages**, of carbide, are furnished in the popular ranges of diameters and pitches in National Form. Thread forms, such

as Modified Whitworth, Metric, etc. can also be furnished. These Ring Gages, in both Go and No Go types, are useful for master or reference gages since they stress long wearing qualities and stability required. Request Circular No. 517 from **Pratt & Whitney, Div., Niles-Bement-Pond Co., West Hartford 1, Conn.**

20. **Nedco Sanding & Polishing Machines** are illustrated with complete descriptions and specifications of eight standard models in a new 4-page folder. Attachments and accessories for use on both sanding and polishing units are listed.

More Service FOR YOUR MONEY

from a Mall 7"
**HEAVY-DUTY
POLISHER-SANDER**

Model
127
PS

\$39.50

Weights Only 7 1/2 Lbs.



OPERATES OVER 50 ATTACHMENTS for Polishing, Sanding, Drilling, Metal Shearing, Wire Brushing, Rotary Filing, and many other applications.

A QUALITY TOOL at a ridiculously low price. Built for continuous use. Powerful 115 volt AC-DC motor is designed to deliver constant speed with every attachment. Furnished with 7" backing pad, polishing bonnet, and assorted abrasive discs.



**HEAVY-DUTY
1/2" Mall Drill**

\$39.50

Model 127

Has all the features of the Mall 127 PS Polisher-Sander illustrated above. Equipped with 1/2" Jacobs Chuck. Has 1/2" capacity in metal, 1" in wood, 500 r.p.m.

Write today for FREE 52-page booklet "Mall Tools" and name of nearest dealer.

32 Factory Owned Service Stations from Coast to Coast provide quick, dependable repair service. Over 1000 Mall Tools for a million jobs. A Dealer in any town can supply you. 30 years experience manufacturing portable power tools.

MALL TOOL COMPANY

7742 South Chicago Ave. • Chicago 19, Illinois

Request bulletin from **The Nedco Co.**, 88 Rumford Ave., Waltham 54, Mass.

21. True-Point Live Centers, featuring a true center ground in place, adjustable SKF roller and thrust bearings; housing and point hardened and ground; parts within the housing carefully proportioned thereby eliminating vibrations; overhang of center load reduced to a minimum. New 4-page illustrated folder now available from **Oke J. Spendrup, Inc.**, 37 Wall St., New York 5, N. Y.

22. Vascoloy-Ramet Tools, Blanks and Dies are described in a handsome new 8 1/2" x 11", illustrated, 90-page catalog containing complete information on the many V-R carbide tools, grades and blanks, tantung tools and castings, toolholders and inserts and dies, as well as technical data on these tools. This new catalog is available to interested firms upon request; ask for No. VR-440. **Vascoloy-Ramet Corp.**, Waukegan, Ill.

23. Scribe-Chek Cutting Edge Gage, a new, simple method for sharpening circular form tools, features longer tool life, more correct pieces per grind, less machine "down time"; it is said to eliminate trial-and-error tool sharpening methods. Its simple operation enables inexperienced help to sharpen tools correctly. Illustrated descriptive circular available from **Somma Tool Co., Inc.**, 20 Brown St., Waterbury, Conn.

24. Corrosion Prevention with The Metco Metallizing Systems, a new 4-page bulletin explains how rust may be avoided on tanks, bridges, piling, ship hulls, refrigeration equipment, etc. The Metco systems provide zinc or aluminum coatings properly treated to withstand various corrosive conditions. Uses and applications are briefly described in Bulletin 93, available from **Metallizing Engineering Co., Inc.**, 38-14 30th St., Long Island City 1, N. Y.

25. Care of Drills and Reamers, the new 6th edition of this useful, informative booklet, contains recommendations for point grinding of drills and crankshaft drills; information on speeds and feeds, oils and compounds; suggestions for sharpening of reamers and carbide tools; cutting speed tables. Request Form No. 94. **Chicago-Latrobe**, 411 W. Ontario St., Chicago 10, Ill.

26. Wilton Tool Catalog, a useful 36-page brochure, contains information on the complete line of Wilton Vises, "C"

Clamps, Work Positioners, and allied tools. Illustrations, complete specifications, prices for replacement parts are all included. This new catalog, No. 922, is available upon request to **Wilton Tool Manufacturing Co., 925-E Wrightwood Ave., Chicago 14, Ill.**

27. Tool and Die Welding Electrodes, a new 56-page catalog of interest to industry utilizing tools and dies; technical information comprises complete data on metallic arc tool steel welding of interest to purchasing agents, tool process and conservation personnel, designing and methods engineers, welders, etc. Available from **Welding Equipment & Supply Co., 223 Leib St., Detroit 7, Mich.**

28. Benzon Coordinators for semi-automatic hole-positioning for use with vertical boring and drilling machines, milling machines, etc. These devices control hole-positioning for interchangeable parts with extreme accuracy, eliminating the necessity for jigs. New 4-page folder describes these units; available from **Benzon Machine Co., 7th & Washington Ave., Lansdale, Pennsylvania.**

29. Hamilton Hand Trucks, made of steel equipped with rubber tires and ball bear-

ings, with single or double handle, open nose or solid plate, useful for carrying on delivery trucks, are listed in Bulletin No. 71. Complete specifications and prices included. **The Hamilton Caster & Mfg. Co., Hamilton, Ohio**

30. Forest City Radius Tool No. O, designed to take care of smaller radii down to 3/32". Six standard cutters with diameters ranging from 3/16" to 1/2" are furnished in a kit containing block holder, tool holder, cutting tools and a wrench. Described in new 4-page folder containing complete specifications; available from **Forest City Bit & Tool Co., Rockford, Illinois.**

31. Tempilstiks, ingenious marking pencils which indicate the temperature of work pieces during heating process. Below the temperature rating of the pencil, a dry mark is indicated; when stated temperature of the Tempilstik is reached, the mark liquifies. Available in 56 degree ratings of from 113° to 2000° F. New 6-page Catalog No. 501 available from **Tempil° Corp., 132 W. 22nd St., New York 11, N. Y.**

32. Skinner Solenoid Valves, in two-way normally open, two-way normally closed

LATHE CHUCKS

**BRAND NEW—FACTORY GUARANTEED
SOLID SEMI STEEL BODIES
MEDIUM DUTY**

**3 JAW UNIVERSAL
2 SETS OF JAWS — 3 PINION**

Size	Our Bargain Price
4".....	\$25.00
5".....	27.00
6 1/2".....	31.50
7 1/2".....	35.00
9".....	41.00

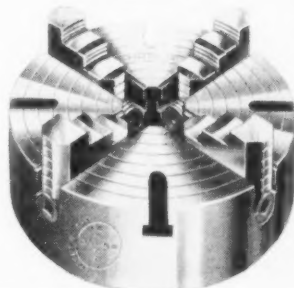
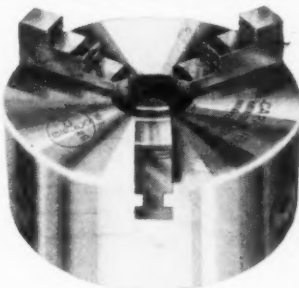
**4 JAW INDEPENDENT
SOLID REVERSIBLE JAWS**

Size	Our Bargain Price
4".....	\$23.00
6".....	26.00
8".....	33.00
10".....	38.00
12".....	48.00
14".....	52.00

**ALL CHUCKS PACKED IN STURDY WOODEN BOXES
PARTS AVAILABLE AT ALL TIMES
SOLD SUBJECT TO APPROVAL**

DEWITT EQUIPMENT CO.

136 LAFAYETTE ST. NEW YORK 13, N. Y.



and three-way two position types are discussed in new 6-page catalog containing sketches of a variety of optional features which can be furnished upon request. Complete electrical data and useful information contained in this bulletin describing the V-5 type valves. Request Bulletin 601 from **Skinner Electric Valve Division, The Skinner Chuck Co., Norwalk, Conn.**

33. Etco-Emrick Drill Chuck, hand-operated, self-tightening, ball bearing type are illustrated in new 4-page catalog giving specifications, sizes and dimensions of these Keyless Drill Chucks. Also listed are Taper and Straight Shanks with No. 1 to No. 4 Morse Taper and No. 7 to No. 10 B & S Taper. Request Bulletin No. 7 from **Etco Tool Co., Inc., 594 Johnson Ave., Brooklyn 6, N. Y.**

34. Single Spindle Disc Grinders, Hanchett Type, are listed in a new 12-page illustrated catalog containing a breakdown of drive types, various types of work tables, specially designed units for wet or dry grinding, automatic single wheel grinders, with complete mechanical and electrical specifications. Bulletin No. 546-2RM available from **Mattison Machine Works, Rockford, Ill.**

35. Injection Molding Equipment for high capacity plastics molding is described in a 4-page, 3-color folder containing design details, operating features, applications and illustrated parts. Three new types of injection molders are discussed, covering a wide performance range. Copies of this Speed-Flo catalog may be had upon request to **The Fellows Gear Shaper Co., Springfield, Vt.**

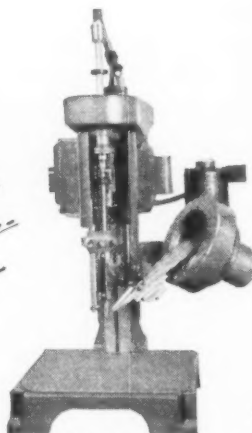
36. Precise Grinder-Millers and Mounts, a new 8-page form contains many illustrations of these precision tools in actual operation. Stressing .0001" accuracy, Precise Grinder-Millers represent a "major development in production engineering," according to their manufacturers. Various compound and universal tool mounts also listed. Request Form FG8-10M-450 from **Precise Products Co., 1331 Clark St., Racine, Wis.**

37. Tubular and Split Rivets in steel, brass, copper, aluminum, nickel silver, stainless steel and monel are offered in a new 12-page, 3-color price list, well illustrated. Complete explanations of types, full size illustrations, as well as descriptions of power driven single and double rivet setters and foot power sin-



We Make the
SECONDS COUNT
for YOU!

Our method saves you time and labor, figured not only in minutes, hours, days or months, but SECONDS AS WELL, through the remarkable speed of **DETROIT POWER SCREWDRIVERS**. In fact, you can drive screws as fast as one a second; all types of screws. No danger of marring heads or stripping threads—and all screws are driven to uniform tension. There is a Detroit Power Screwdriver to fit your requirements.



**MODEL A
BENCH TYPE**

*Write Today
for CATALOG*

DETROIT POWER SCREWDRIVER CO.

2802 W. FORT ST.
DETROIT 16, MICH.

gle setters are included. Request Price List No. 39 from Chicago Rivet & Machine Co., Bellwood, Ill.

38. "Disc Grinding", a new 18-page, 5" x 7" booklet published by the Grinding Wheel Institute discusses the safe handling, storage, mounting and use of abrasive discs used in disc grinding and describes the features which are peculiar to this type of precision grinding. Sketches and tables enhance the value of this brochure, available from the Grinding Wheel Institute, P. O. Box 64, Greendale, Mass.

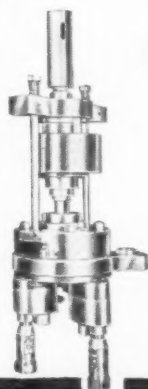
39. Air Turbine Portable Grinders consisting of three models, with speeds of 75,000, 50,000 and 38,000 r.p.m., are described and illustrated in new Bulletin. Also shown is new Hole Grinder attachment for jig borers, boring mills and similar machines. A page is devoted to industrial air turbine motors. For copies of Bulletin 1129, write Onsrud Machine Works, Inc., 3908 Palmer St., Chicago 47, Illinois.

40. Mercury Automatic Clutches discussed in three new bulletins covering complete line. Bulletin 216, 8 pages, de-

scribes Mercury Clutch in general, listing various applications from air conditioning to washing machines; Bulletin 217, 4 pages, deals with Mercury Automatic Clutches for gasoline engines; Bulletin 218, 4 pages, covers electric motor installations. Mercury Clutch Division, Automatic Steel Products, Inc., Canton 6, Ohio.

41. Steam, Air, Gasoline Traps are discussed in new 32-page illustrated catalog; 5 types of thermostatic steam traps for pressures up to 225 lbs; 2 types of expansion steam traps for pressures to 250 lbs.; 3 types of weight-operated traps for steam, air, gasoline, pressures to 1500 lbs.; piston-operated steam traps for pressures to 650 lbs. Capacity tables, installation diagrams, charts and formulae included. Catalog No. 250. W. H. Nicholson & Co., 12 Oregon St., Wilkes-Barre, Pa.

42. Spacemaker Electric Tying Truck is fully described in a 4-page, 2-color bulletin; three models are explained: the skid tying model, pallet tying model for single faced pallets and a pallet tying model for double faced pallets. Complete specifications and proven applications are included. Request Bulletin No.



Only **ERRINGTON** Adjustable TAPPING HEAD Offers So Many Advantages

Sizes $\pm 0 - \pm 10$ Tap to $5/16"$
 $\pm 1 - 3/16"$ Tap to $1/2"$
No. Spindles: 2 to 6

Here's a versatile tool which permits you to take advantage of a wide range of adjustment — without overhang. Supplied with 3 spindles for equal adjustment in line and 3, 4, 5 or 6 spindles for equal adjustment on bolt circles.

Write for Complete Information

- Fully geared
- Needle bearings on all spindles in head
- Ball thrust bearings throughout
- Bronze bushed

ERRINGTON
MECHANICAL LABORATORY, INC.

Established 1891

Main Office & Plant:
Staten Island 4, New York

- Sand cast aluminum case
- All parts fully enclosed for pressure lubrication and protection
- Non-slip positive clamping on all adjusting members

701 from **Lyon-Raymond Corp.**, 21171 Madison St., Greene, N. Y.

43. Homogeneous Lead Anodes for Chrome Plating are discussed in a new bulletin containing six anode styles, ten lead-to-copper bond types of hooks, with complete specifications and order information. Request Bulletin 1617 from **Republic Lead Equipment Co.**, 7930 Jones Road, Cleveland 5, Ohio.

44. Precision Ground Flat Stock and Die Stock, oil hardening, oil and water hardening, and water hardening types, together with prices and useful information on structure and analysis, heat treatment and tempering of steels are all contained in Bulletin No. 1103 recently issued by **The L. S. Starrett Co.**, Athol, Mass.

45. Proving Ground for production, an 8-page folder recently issued by **Behr-Manning** describes some of the 58 products and services offered by this firm. Faster methods for grinding and finishing operations are offered; laboratories and method rooms are fully equipped in or near 16 major U. S. industrial centers to cope with individual problems. Copies of bulletin are available from **Behr-Manning**, Troy, N. Y.

46. Machine Shop Time Savers, an 8-page booklet lists **J & S** radius and angle dressers, circular cutting tools in carbide and h.s.s.; vise jaws and parallels, jaw clamps, and **J & S** form grinding service. Illustrations and applications of the tools, with adequate descriptions are included. Booklet available upon request to **J & S Tool Co., Inc.**, 477 Main St., East Orange, New Jersey

John S. Barnes Corp., Rockford, Ill., has announced the opening of a Philadelphia sales office, operated by **Ernest A. Isberg and Co.**, Swarthmore, Pa.; the office will serve the eastern Pennsylvania, southern New Jersey, and Delaware areas.

Announcement is made of the appointment of **E. R. Princeton & Associates**, 2456 W. Diversey Blvd., Chicago 47, Ill., as Great Lakes Regional Distributors for industrial tools and products made by **M-M-A, Inc.**, Lancaster, Pa.

Size Control Co., division **American Gage & Machine Co.**, Chicago, has appointed as its exclusive representative in Philadelphia, New Jersey and Delaware, **Ernest A. Isberg & Co.**, Swarthmore, Pa.

SawMore METAL CUTTING MACHINES

If it's speed you need . . . **SawMore Metal Cutting Machines** are your first choice. **SawMore Machines** cut accurately. Operate at lowest cost.

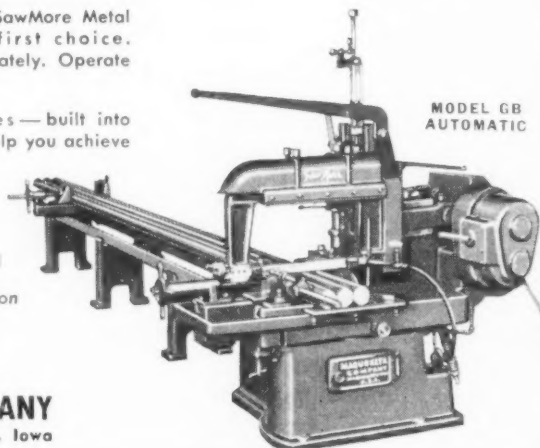
These highlight features—built into every **SawMore Machine**—help you achieve top production.

- Self-aligning blades
- Automatic feed
- Gears—constant mesh
- Positive compensating feed

Write for complete information
on the advantages of
SawMore Machines

MAQUOKETA COMPANY
Clark St. Maquoketa, Iowa

FAST METAL CUTTING . . . MADE EASY!



**MODEL GB
AUTOMATIC**



CUTTERS

All standard sizes carried in stock for immediate delivery. Special cutters made to Blue Print.

CUTTER SPECIALISTS SINCE 1919.

Write today for prices. A few territories open.

QUALITY TOOL WORKS

WAUKEGAN

ILLINOIS

DUAL CROSS and ROTARY FEED

PALMGREN Rotary, Index MILLING TABLE

No. 83 Only \$49.50



Has 8" table, 360° movement and 4" cross feed travel. Adjusting wheels and dials graduated in degrees and thousandths. Slotted for bolting to table. No. 82 without rotary feed \$39.75. Write for Circular No. 354.

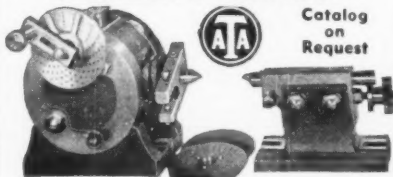
CHICAGO TOOL AND ENGINEERING CO.
8384 South Chicago Ave. Chicago 17, Ill.



Precision Die Made — Lowest Possible Cost.

DAYTON ROGERS MFG. CO.
Minneapolis 7, Minn.

CARROLL DIVIDING HEADS



Catalog on Request

3 SIZES - 4 MODELS - 6" to 12"
TROYKE MFG. CO.
4422 APPLETON ST. CINCINNATI 9, O.

READING BENCH KEYSEATER

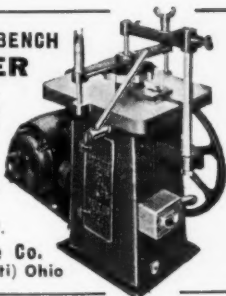
Portable — move directly to job; a time saver for both small and large shops.

3 1/4" stroke; adaptable for other work.

Low first cost — prompt delivery.

Good dealers wanted.

Reading Machine Co.
Reading (Cincinnati) Ohio



CAMS

Our ROWBOTTOM cam cutting facilities are at your disposal for your cam requirements.

We solicit your inquiries.

BLOOMFIELD TOOL CORP.
36 FARRAND ST. BLOOMFIELD, N. J.



THE ACROMARK CO.

15 MORRELL ST. ELIZABETH 4, NEW JERSEY



Remove burrs!
Chamfer holes!

NOBUR TOOLS

Industry's unmatched tool for FAST, COST-REDUCING PRODUCTION

WRITE TODAY

NOBUR MANUFACTURING CO.
717 North Victory Blvd., Burbank, Calif.

**FOR SMALL
JIG BORING
PUT SMALL JOBS ON THIS
LINLEY MACHINE**



and save your larger machines for heavier work.

**YOU'LL BE
SURPRISED!**

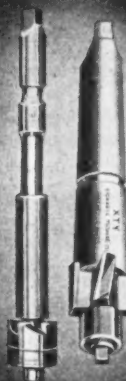
at the extremely low first cost and the vitally important jobs that this little precision machine can do. It will pay you to get our accuracy information on this machine which has 6" x 10" table movement and 7" x 17 1/2" table size.

Write TODAY For
Full Information

**LINLEY BROS.
COMPANY**

663 State St. Ext.
Bridgeport 1, Conn.

High Speed
**COUNTERBORES
BACK
SPOT
FACERS**



Interchangeable

*Catalog
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BICKNELL-THOMAS COMPANY
Greenfield Massachusetts

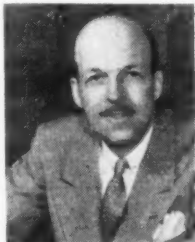
*Appointments &
Promotions*

Hugh W. Vogl, president of the Wilton Tool Mfg. Co., Chicago, has announced the appointment of **Lawrence M. Rich** as vice president in charge of sales.

Robert H. Morse, Jr. has become president of Fairbanks, Morse & Co., Chicago, succeeding his father, Colonel Robert H. Morse, retiring after 55 years with the company.



Robert H. Morse, Jr.



E. W. Donkel

The board of directors of the Kent-Owens Machine Co., Toledo, Ohio, announced the recent election of **E. W. Donkel** as president to fill the post vacated March 3rd by the death of his father.

The appointment of **C. B. Marshall, Jr.** to the sales force of the Chicago district sales office of The Babcock & Wilcox Tube Co. was announced recently by L. E. Jeanneret, manager of sales, welded tube division.

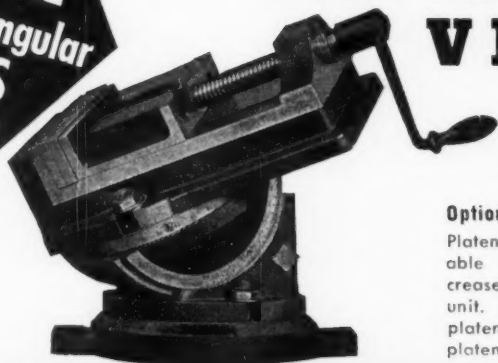
Leo B. Glaser has been appointed manager of the newly formed Negator Division of the Hunter Spring Co., Lansdale, Pa., according to W. J. Cook, general manager.

The appointment of **John A. Menster** as assistant manager of sales for the Welded Tube Division of The Babcock & Wilcox Tube Co., Alliance, Ohio, has been announced by L. E. Jeanneret, manager of sales.

Dr. Everett P. Partridge, director of research of Hall Laboratories, Inc., and Calgon, Inc., has been named a director of Hall Laboratories, Inc., Pittsburgh.

SAVE TIME
on intricate, angular
SET-UPS

Fully universal . . . 3 swivels simplify setting of compound angles. Parts interchangeable. . . . Can be used as a plain flanged vise, swivel vise, multi-swivel vise.



Master Multi-Swivel **VISE**

Optional Accessory

Platen, interchangeable with vise. Increases capacity of unit. Uses: as plain platen, multi-swivel platen.

DONOVAN MANUFACTURING COMPANY

80 BATTERYMARCH ST.

BOSTON, MASS.

Appointment of **Harry R. McCullough** as sales manager has been announced by P. W. Voss and Associates, Chicago representative for Automatic Transportation Co., Chicago.



**Alexander H.
d'Arcambal**



**Edwin J.
Schwanhausser**

Frederick U. Conard, president and general manager of Niles-Bement-Pond Co., West Hartford, Conn. has announced the election of two new directors to the firm's board of directors: **Alexander H. d'Arcambal**, vice president, general sales manager, and consulting metallurgist of N-B-P Co., and **Edwin J. Schwanhausser**, executive vice president of the Worthington Pump and Machinery Corp., Harrison, N. J.

The Riverside Metal Co., Riverside, N.J. has appointed **George W. Spanberg** manager of its Chicago sales office at 549 W. Washington Blvd.; **James T. Duffy, III.** has been named assistant in the Chicago office.

Norton Company, Worcester, Mass., has announced the appointments of **W. Earle Shumway** as manager, sales engineering department, Abrasive Division, and **Fred L. Curtis** as sales manager, Western Division.

Robert C. Blackinton has been appointed to the position of plant manager of the Pioneer Engineering and Manufacturing Co., Detroit.

Arcos Corporation, Philadelphia, announces the appointment of **Bernard E. David** as special field engineer, located in Los Angeles; **Walter Gordon List** as special field engineer in the Ohio-Western Pennsylvania territory, and **J. J. Schloss** as sales representative in the Philadelphia district.

Chain Belt Company of Milwaukee announces the appointment of **Marshall E. Cusic** as a district sales engineer with headquarters at the Pittsburgh district office, 1101 Grant Bldg., Pittsburgh 19, Pa.

Baker Industrial Truck Division of The Baker-Raulang Co., Cleveland, has announced the election of **Robert H. Davies** as vice president and acting general manager and **Edward H. Remde** as vice president.

C. Stewart Ferguson, for 31 years with General Electric Co. as chemist, engineer and executive, has been appointed technical director of the Marshall-Eclipse Division of Bendix Aviation Corp., Troy, N. Y., according to an announcement by F. C. Weyburne, general manager of the division.

Appointment of **Blake C. Hooper** to the sales staff of P. W. Voss and Associates, Chicago sales representative for Automatic Transportation Co., has been announced by Voss.

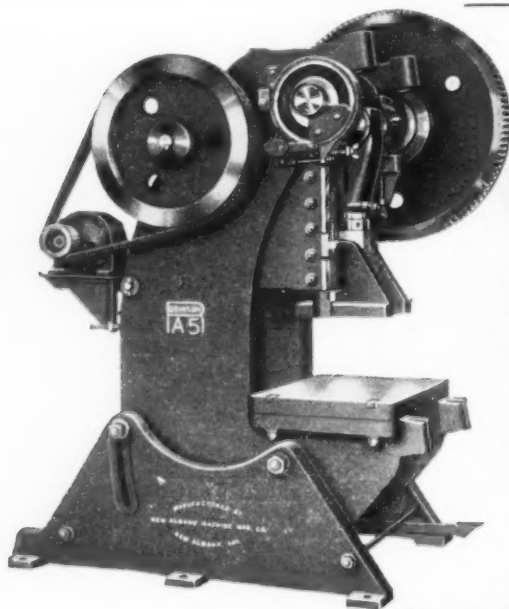
The welding engineering staff of four district offices of Lincoln Electric Co., Cleveland, has been increased recently; **J. W. Brooks** is now serving the Boston area as welding engineer; **J. J. Chemerys** is serving industrial accounts in the Syracuse territory; **W. R. Karll** has assumed sales and engineering responsibilities in the Newark office; **R. G. Todd** has joined the welding engineering staff of the Tulsa, Oklahoma office.

Alexander H. d'Arcambal, vice president and general sales manager of Niles-Bement-Pond Co., West Hartford, conn. announces the appointment of **Vas L. Howe** as advertising manager of the firm, including the Pratt & Whitney Division, Chandler-Evans Division, and Potter & Johnston, Pawtucket subsidiary.



Vas L. Howe

Link-Belt Company, Chicago, has recently announced the election by the Board of directors of **David E. Davidson** as vice president for sales; **Eugene P. Berg**, late assistant general manager, has been appointed general manager of the Pershing Road plant, Chicago, to succeed Davidson.



INCLINABLE PUNCH PRESSES SERIES A

ROBINSON

A-5 Motor Drive 88 Ton Geared Inclinable Punch Press with Anti-Backlash Brake to take care of kick back when using air cushion and heavy spring pressure pads. Timken bearings in clutch wheel and back shaft bearings. Available in 14, 22, 32, 56 and 88 ton capacity. Literature on request.

**New Albany Machine
Mfg. Co.**

New Albany, Ind.

DEALERS AND DISTRIBUTORS

Heinemann Electric Co., Trenton, N. J. has appointed **George R. Horne & Co.**, Dearborn, Mich., exclusive representative covering the Michigan territory, consisting of the lower peninsula except Berrien County.

The Riverside Metal Co., Riverside, N. J. has appointed the **Clifford Metal Sales Co.**, Providence, as a warehousing distributor in the Rhode Island area.

The Liberty Equipment Co., 2022 E. 7th St., Los Angeles 21, Calif., announces its appointment as exclusive West Coast jobber for the complete line of ground flat stock tool steel manufactured by Marshall Steel Co., McCook, Ill.

Willson Products, Inc., Reading, Pa., announces the appointment of **Van Dusen Aircraft Supplies, Inc.**, as its representative in the aviation field; home office of Van Dusen is in Minneapolis, with Eastern offices in Teterboro, N. J. and at the Boston-Bedford Airport, Bedford, Massachusetts.

The Taft-Peirce Manufacturing Co., Woonsocket, R. I. announces the appointment of the **Tool Supply and Engineering Co.**, Dallas, Texas, as its representative in the Dallas, Fort Worth, and northern Texas areas, handling sales and service of all Taft-Peirce products with the exception of machine tools.

Isaac Harter, chairman of the board of The Babcock & Wilcox Tube Co., Beaver Falls, Pa., has recently been named a Fellow of The American Society of Mechanical Engineers; this honor is conferred upon engineers with at least 25 years of active practice, and is held by less than 1% of the ASME membership.

WESPO

SET-UP JACKS

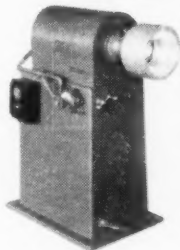
A useful aid in set-up work for tool and production shops. Many uses. Has hardened set screw and jam nut to lock in position. Write for prices and bulletin of 350 fixture parts.

WEST POINT MFG. CO.
19633 MERRIMAN COURT
FARMINGTON, MICHIGAN



SCHAUER

SPEED LATHES



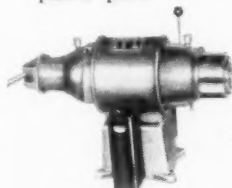
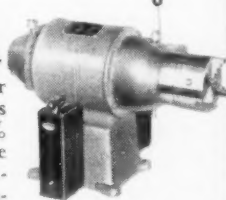
Who Uses Them?

General Electric • Aluminum Co. of America • Studebaker • Thos. A. Edison • Ford Motor • Westing-

house Electric • Owens Illinois Glass • Lockheed Aircraft • Western Gear Works • Bryant Electric • Royal Typewriter • Yale & Towne • Eastern Airlines • Minneapolis Honeywell • Remington Arms • American Locomotive • American Brass . . . and several hundred more top drawer companies!

Why?

Because Schauer Speed Lathes cut from 30% to 90% off the cost of polishing, filing, lapping or de-burring small metal and plastic parts!



• Chuck, collar or vacuum holding fixtures.

- Single speed, two-speed or variable speed models.
- **SAVE WITH SCHAUER!** Write for Bulletin 490.

SCHAUER MANUFACTURING CORP.

Originators of Today's Speed Lathes
2064 Reading Rd., Cincinnati 2, Ohio



The simplified PYRO Optical is the ideal instrument for direct temperature readings of ANY heated object in your plant. Completely SELF-CONTAINED, PORTABLE, RUGGED, LIGHT WEIGHT (3½ lbs.) and FOOL PROOF. No correction charts, no accessories and no maintenance expenses. Unique design permits temperature determinations even on MINUTE SPOTS. Fast MOVING OBJECTS and of the SMALLEST STREAMS.

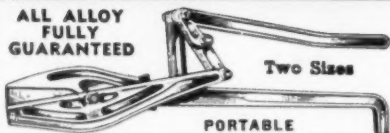
Write for Catalog No. 80

THE PYROMETER INSTRUMENT CO.
New Plant and Lab., Bergenfield 3, N. J.

BREMIL

The IMPROVED Compound Lever Shears

ALL ALLOY
FULLY
GUARANTEED



Two Sizes

PORTABLE

No. 1 cuts up to No. 11 gauge strip or sheet.
No. 2 cuts up to ¼" steel plate.

BREMIL MFG. CO.
1720 Pittsburgh Ave., Erie, Pa.

SMALL LOT

STAMPINGS

Low Cost Precision Dies
25 to 10,000 Pieces Economically
Send Prints or Samples for Prices

ROCHESTER PRODUCTS CO.
ROCHESTER, MINNESOTA

TO INCREASE PRODUCTION AND TO IMPROVE
EFFICIENCY USE

BUTTERFLY FILING AND DIE MAKING MACHINES

This is a powerful machine for heavy or small precision work in use all over the world: Airplane Factories, Aluminum Plants, Toolrooms where fast production is desired. 4 Models, No. 16, No. 14 "EL" and Model "D." The larger the Model, the bigger the stroke and therefore more filing is performed. Furnished with or without pedestals.

Constructed as per specification of U. S. Naval Aircraft Factories.

HARVEY MFG. CORP.

161 Grand St., New York,

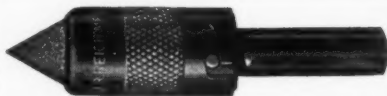
Phone Canal 6-5170



DRILL THESE HOLES

BY A QUICK, EASY, INEXPENSIVE METHOD
Your business letterhead will bring literature

WATTS BROS. TOOL WORKS
Wilmerding, Pa.



ABRASIVE CENT-R-LAP TOOL

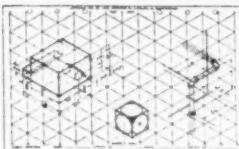
Saves time, eliminates diamond dressing. Cones changed in seconds. Available in 2 sizes ½" and ¾" Cent-R-Laps and abrasive Cones.

Write for descriptive literature and prices.

J. R. Reich Manufacturing Co.
45 E. Stroop Rd. Dayton 9, Ohio

ISOMETRIC SKETCHES ARE

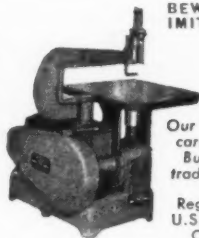
EASY TO MAKE
AND READ!



One trial will make you another steady user of WADE'S ISOMETRIC blue lined paper. Shows all surfaces and interior to scale.

Makes clear blueprints. Saves time daily in hundreds of plants. Write for Circular.

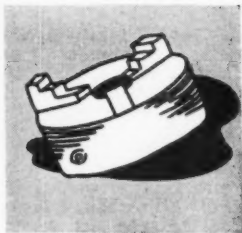
Wade Instrument Co. Dept. H, R.F.D. 1
Chardon, Ohio



BEWARE OF
IMITATIONS

Our machine
carries the
Butterfly
trade mark.

Registered
U.S. Patent
Office



MTBB

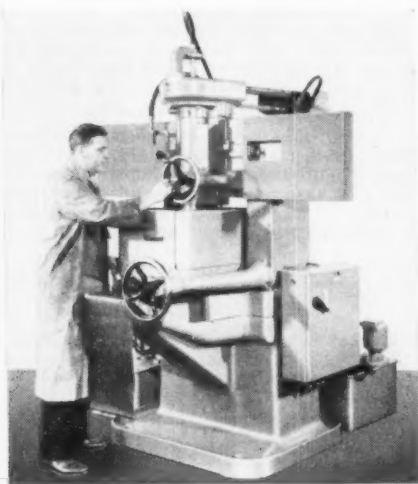
SEPTEMBER, 1950

What's New in Metalworking

NEW P & W GRINDER FOR SURFACING H.S.S. AND CARBIDE DIES

Pratt & Whitney, Division Niles-Bement-Pond Co., Hartford, Conn., announces a new surface grinder which is specifically designed for facing new die blocks, reconditioning dulled impression edges and preparing worn dies for re-sinking, as well as being suitable for regular surface grinding. The machine is built in two sizes with table capacities 16" x 24" and 36" x 42"; it is designated the Pratt & Whitney Vertical Die and Surface Grinder.

subsequent lapping or polishing and with minimum breaking-down of cutting edges. This has the double advantage of substantially increasing productive die life and reducing press down-time. Sufficient clearance is provided to permit grinding between guide pins on blanking punch and die halves, thus considerable time savings are obtained in re-surfacing dulled impression edges by eliminating much of the disassembly and reassembly time.



Operating like a vertical profiler, it finishes flats around irregular reliefs, and is stated to be ideal for precision step grinding. $1\frac{1}{2}$ to 2 micro inch surface finishes are produced without need for



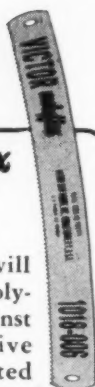
The machine consists of a rigidly constructed bed on which a hydraulically operated table reciprocates. A cross rail, supported by two uprights to the bed, carries a vertical spindle which can be moved cross ways by a sensitive control



**ASK YOUR VICTOR
DISTRIBUTOR ABOUT**

the NEW *molyflex* High Speed Hand Hack Saw Blades

Your Victor distributor will tell you that this new "Molyflex" . . . when pitted against eight leading competitive blades in cutting treated SAE 52100 ball bearing steel . . . *averaged 23.8% more metal cut* than all the leading brands tested. He will tell you that this new "Molyflex" . . . an addition to the Victor line . . . has greater uniformity, is absolutely shatter-proof and unbreakable when used in a frame.



VICTOR STEELRITE METAL MARKING CRAYONS

Ask your Victor distributor about the new Victor Steelrite Metal Marking Crayons. Available in a variety of sizes, these crayons are made of genuine soapstone. Special extrusion process insures uniform strength and composition. Markings can be made on hot, cold, damp or grimy metal and withstand pickling, yet do not affect enamel application.

Don't forget to ask for a free copy of the Victor Metal Cutting Booklet for your pocket or tool kit and the Victor Wall Chart for your shop. They'll help you get the maximum efficiency from your metal cutting saw blades.



SAW WORKS, INC., Middletown, N. Y., U. S. A.

**Makers of Hand and Power Hack Saw Blades,
Frames and Band Saw Blades**

handwheel. The 16" x 24" machine accommodates 3" and 5" diameter cup wheels, and 10" diameter ring wheels are used on the 36" x 42" machine. Constant coolant is supplied through the center of the spindle to the inside of the wheel and through an auxiliary line to the outside of the wheel. Suitable guards enclose the table and confine the spray thrown by the wheel. Adjustable guards and circular brushes for each size wheel are provided for additional control of the spray.

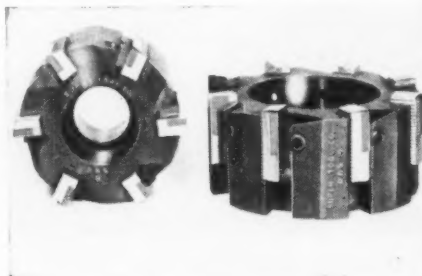
The 16" x 24" Die and Surface Grinder is equipped with three spindle speed changes which adapt the machine for grinding carbide or tough die steels. The speeds are especially suited for 3" and 5" diameter grit cup wheels and diamond cup wheels. The table hydraulic drive has a variable feed range from 1 to 20 feet per minute.

The 36" x 42" Vertical Die and Surface Grinder accommodates the larger sizes blanking punch and die and forging dies. A 10" ring wheel is used on this machine with a spindle speed of 1750 r.p.m. Table hydraulic power feeds range from 1 to 40 feet per minute.

Carbide Tipped Shell End Mill

A new carbide tipped inserted blade Shell End Mill has been designed by Super Tool Company, 21650 Hoover Road, Detroit 13, Michigan, for the efficient milling of cast iron, brass, etc.

The carbide tipped replaceable serrated back blades are firmly held, easily adjusted, and their sturdy construction insures maximum rigidity at high table feeds, as well as long and trouble-free production life, according to Super Tool.



This new cutter is offered to standard specifications in 3", 4", 5" and 6" diameters, in right hand only, the number of blades in each case being twice the diameter of the cutter.

Precision Visual Thread Comparator

The Hanson-Whitney Company, Hartford, Conn., introduces a new precision instrument expressly designed for the inspection and production gaging of external threads. It has been carefully tested since 1945 in checking all forms of threads, including critical aircraft threads and is now available to all manufacturers.



The indicator tells at a glance whether the product is oversize, undersize, eccentric, tapered, or if lead error exists. The work is recorded visually to accepted ring gage tolerance, thus eliminating the human-error possibility of "feel."

The device's capacity covers external threads from No. 0 through 3 $\frac{1}{8}$ " diameter, both coarse or fine pitches in all classes. (Class 5 can be furnished on specific request.) The simplicity of design and action permits checking of up to 20 pieces

per minute; three minutes are sufficient to change thread diameter units.

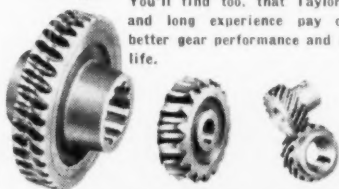
The upper anvil is easily positioned in relation to the lower (stationary) anvil (actually a split internal thread member) by insertion of the setting plug and tightening of an indicator lock-screw. The indicator is equipped with tolerance hands and is graduated in tenths of thousandths to check within .0002" accuracy. The complete gaging unit may be removed from the base for checking parts on a machine. Any type of indicator with $\frac{3}{8}$ " shank can be used.

"TAYLOR MADE" MEANS TO YOUR MOST EXACTING SPECIFICATIONS



Whether your "specs" call for a single gear or an intricate drive, whether the quantity is one or thousands, you'll find Taylor Gears fit your specs exactly in each detail of material, tooth, pitch, face and bore.

You'll find too, that Taylor skill and long experience pay off in better gear performance and longer life.



TAYLOR

MACHINE COMPANY

CUSTOM GEAR MAKERS

2034 East 77th St.

Cleveland 3, Ohio

SEND US YOUR PRINTS FOR *Quotations*

MICRO-MINIATURES...

Small END MILLS AND ROUTER BITS

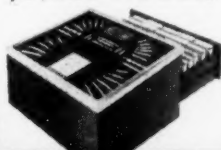
Ground from SOLID. Made to do a NEW job of milling and routing at high speed and fast feed on production runs as well as in the tool room.

THE SECRET

of their durability and long life lies in our method of grinding which produces a smooth, unbroken cutting edge. No saw tooth edge to load-up and break-down.



See the display of Micro-Minatures at your jobbers or write us for details.

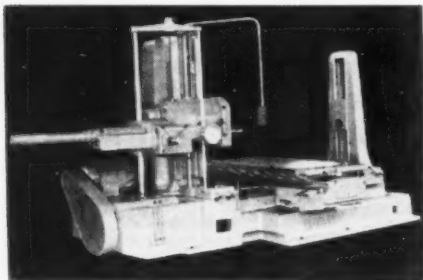


WOODSON TOOL CO., Inc. • 4811 $\frac{1}{2}$ LENNOX BLVD. • INGLEWOOD, CALIFORNIA

Lucas Horizontal Boring Machine Redesigned

The New Britain Machine Company has announced that its Lucas Machine Division, Cleveland, Ohio has completely re-designed and re-styled its 3" and 4" spindle series of horizontal boring, drilling and milling machines.

The illustration below shows a Model 42B-60 4" machine, the result of several modernizing changes in the basic Lucas design. Beginning at the left hand or



power supply side of the machine, the bed has been extended to support the motor, and speed and feed gear boxes. The number and size of control handles

have been reduced and each control has been color coded. Feed unit selecting levers indicate direction of feed and feeds can be combined.

The spindle is mounted on anti-friction taper roller bearings, and the spindle is driven at the high speed range by a vibration-free V-belt drive, making it possible to run the spindle at high speeds to get full advantage of carbide tools. The double gear, mounted on the spindle sleeve which is the drive for the two lower speed ranges, is out of mesh in the high speed range and acts as a fly-wheel to dampen out vibration.

An automatic power positioning control allows the operator to set up and run through a complete production job merely by inserting master rods and then, through regular operating controls, get exact settings without hand adjustment, for subsequent operations. This feature is useful when a quantity of the same kind of piece is being processed. The automatic power positioning unit allows the operator to go through all operations without the use of jigs or fixtures. Short runs can also be done with the automatic power positioning by using standard end-measuring rods.

Beverly THROATLESS SHEAR

Cut any Shape... STRAIGHT OR IRREGULAR



MODEL B-3 with Ball Bearing Hold Down

Make straight or intricate cuts in the lightest metals without distortion, yet handle heavier gauges with ease on a Beverly. Smooth, powerful, clean cutting action.

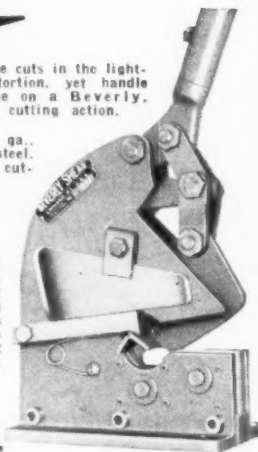
Made in 4 sizes to handle 18 ga., 14 ga., 10 ga., and 3/16" mild steel. H.C.H.C. Blades available for cutting stainless steel.

NEW WIRE ROPE AND CABLE CUTTER

Cuts wire rope and heavy electrical cable at one stroke. Circular cutting action assures finished cut at one stroke. Snap-Action Hold Down permits instantaneous adjustments for varying sizes. Capacity: wire rope 1 1/2"; aperture 1". Weight 30 lbs.; base dimensions 8" x 5".

Write for Illustrated circulars on Beverly Cost Cutting Tools.

BEVERLY SHEAR MFG. CO., 3005 W. 111th St., Chicago 43, Ill.

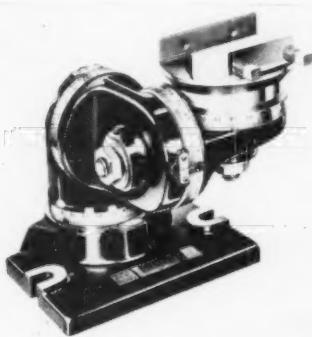


The Lucas machine is built in 3, 4, 5 and 6-inch spindle sizes with a variety of heights of column, lengths of beds and lengths and widths of table. These machines are offered with two-way beds and also four-way beds with integrally cast outer ways having hardened strips to support the table and saddle through long cross travel. The 3, 4 and 5 inch spindle machines are built with lever controls for feed engagement and a movable electric pendant with buttons to remotely control stopping, starting and jogging. The 4, 5 and 6 inch models are also available in electrically controlled machines whereby all motions of every unit are regulated from a separate movable pendant control.

Delta Introduces Universal Vise

"The first truly universal vise providing four separate, distinct planes of adjustment for grinding, drilling, and milling." Thus the Delta Power Tool Division, Rockwell Manufacturing Co., 604 E. Viena Ave., Milwaukee 1, Wis., describes the Univise.

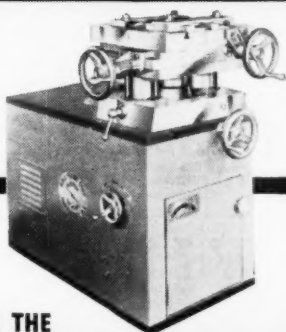
The Univise is said to fit any surface grinder or tool grinder. Because the keys in its base can be detached, the tool can also be used on a drill press or other machine without table slots, or on a magnetic chuck. The vise is 5 13/16" high, 6" wide, and 7 1/4" long. Its jaws take up to 1 1/2" tools.



According to Delta Engineers, the Univise is made up of four separate parts, each of which can be rotated. This provides four separate, distinct planes of adjustment and permits the Univise to hold a tool at any conceivable angle.

Each part has a circular scale of 360°. Settings can be made correctly direct from a blueprint, without guesswork. On duplicate grinding, the vise can be returned exactly to its original setting.

SPINDLE AND CUTTER ARE DOWN UNDER



ON THE

Electrix... PRECISION DIE MILLER

The ELECTRIX PRECISION DIE MILLER is designed to mill inside and outside shapes such as blanking dies, draw dies and cams. Milling of complicated die and cam outlines is reduced to minutes with the ELECTRIX PRECISION DIE MILLER.

Actually see complicated outlines milled in minutes — NOT HOURS.

Inverted infinite speed precision spindle from 200 RPMs to 3600 RPMs—New Departure sealed for life bearings—Counter balance fly wheel—assuring smoother finish and longer tool life.

For Particulars Write

ROLL FEEDS CORP.
PAWTUCKET . . RHODE ISLAND
Builders of "RFC" Roll Feeds

PRECISION BUILT MACHINIST VISE

Enclosed design prevents chips and dirt from entering internal parts. The balanced motion of a fine threaded spindle, moving freely in an ingeniously anchored sleeve type nut, eliminates dead motion and strain on moving parts. Head moves in precision broached keyway. Complete size range of bench and combination pipe vises. Before you buy, write for our descriptive catalog and give us the name of your preferred distributor.

WILTON TOOL MFG. CO.

925-E Wrightwood Av., Chicago 14, Ill.

WILTON

THE FINEST NAME IN VISES



5 YEAR GUARANTEE



"C" CLAMPS

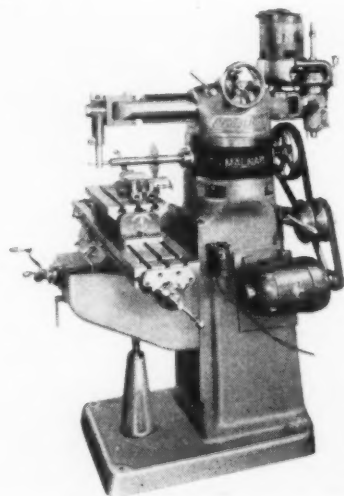
OF PEARLITIC CASTINGS — tensile strength up to 80,000 P. S. I. — lower in price than forged clamps yet equally efficient.

New Unit Makes Bridgeport Miller Universal

Created and engineered for the Bridgeport Vertical, the Malnar Horizontal Unit makes a Bridgeport Miller universal, while eliminating errors in resetting from vertical to horizontal operation. The job is set up as usual and worked vertically with the Bridgeport head, or the Bridgeport can be swung away and the job machined horizontally with the Malnar Unit. This device is permanently centered on zero and the Bridgeport vertical head swings back immediately to the zero position. The unit is manufactured by Malnar Machine & Tool Co., Inc., 19301 St. Clair Ave., Cleveland 10, Ohio.

Timken Precision Roller Bearings assure vibration-free operation. The horizontal spindle, heat-treated and precision ground, is stated to be strong enough for heavy end milling, fly-cutting, boring, drilling, etc. A standard No. 10 Brown & Sharpe Taper Spindle is furnished with the unit or a special taper to individual specifications can be ordered. Any taper such as a standard No. 9 Brown & Sharpe, or a No. 35 or No. 40 is available. Speed ratio is approximately 15 to 1.

The Malnar Horizontal Unit ready for installation includes a horizontal housing

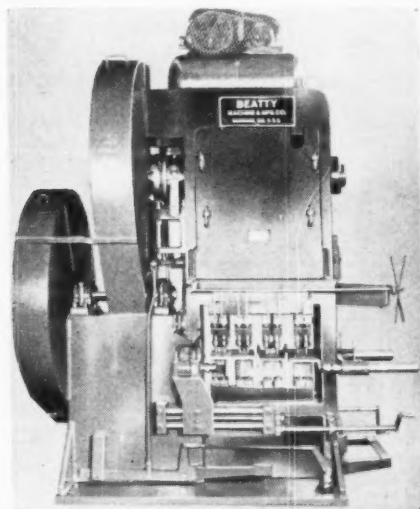


complete with precision spindle and Timken Precision Roller Bearings; variable speed drive complete with pulleys and

belts; horizontal milling arbor support; one 2 h.p. reversing switch; one 1 h.p. 220-440 volt, 3 phase, 60 cycle 1750 r.p.m. ball bearing motor; motor mounting base; belt guard and necessary mounting bolts. The Malnar Unit is stated to be easily installed with standard tools.

Beatty Beam and Shape Punch

Beatty Machine & Mfg. Co., Hammond, Indiana, has introduced a new Guillotine Beam and Shape Punch designed to punch plates or webs of beams, channels and angles. The unit can also be furnished with special overhang die blocks for punching flanges of small beams and channels.



The machine illustrated above is equipped with air operated clamps against adjustable fixed stops, and gag operating levers for operation of machine from right side. Punch tools are gaged for selective punching. Other features include adjustable strippers, jaw clutch with auto stop at top of stroke, anti-friction type flywheel shaft bearings. The illustration shows punching arrangement for punching angles in pairs, beams or channels.

The unit has a capacity of 200 tons or four 15/16" dia. holes thru 3/4" plate. The stroke is 2 1/2". The distance between housings is 32". Size ram, right to left, 28"; size ram, front to back, 13". Size table, right to left, 32"; size table, front to back, 21". The die space is 26".

WET or DRY
CARBIDE TOOL GRINDERS

HAMMOND Carbide Tool Grinders will soon pay for themselves through greater wheel economy, longer tool life and faster grinding.

AMERICA'S MOST COMPLETE LINE.

6", 7", 10", 14" Wet or Dry—also Chip Breaker and Diamond Finishing Grinders.

WRITE FOR CATALOG 220

Model WD-10 Wet or Dry 10" Carbide Tool Grinder.

Hammond Machinery Builders

1614 DOUGLAS AVENUE

KALAMAZOO, MICHIGAN

PORTABLE ELEVATING TABLE



Saves TIME and LABOR

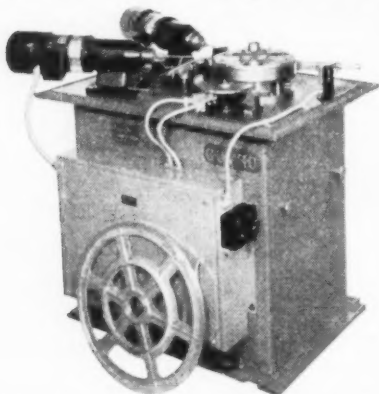
Eliminate heavy lifting and cut handling costs. Slight foot pressure varies height up to 15 1/2", leaving operator's hands free. Table swivels and locks in any position.

SEND TODAY FOR ILLUSTRATED CATALOG NO. 2

MIDWEST TOOL & ENG. CO.
112 WEBSTER ST., DAYTON, OHIO

Combination Drilling and Tapping Machine

A semi-automatic machine which drills and taps radial holes in parts such as the one shown leaning against the ma-



chine, has recently been announced by the Govro-Nelson Co., 1933 Antoinette, Detroit 8, Mich.

The machine is provided with one

Govro-Nelson drilling unit and one tapping unit. As the operator hand-indexes the part, the drilling unit starts to drill; when the first hole drilled is in tapping position, the tapping unit starts to tap. From here on, the drilling and tapping units operate simultaneously. When all holes have been drilled, the drilling unit stops but the tapping unit continues until all holes have been tapped.

While it is a hand-indexed machine, the unit is so interlocked that the operator cannot index the part until both spindles are out of the work. Likewise, the units cannot operate unless the operator has completed the index. The units may be positioned according to the character of the part and the number and spacing of the holes to be drilled and tapped.

Miller Low-Pressure-Air Accumulators

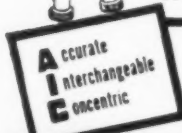
Low-pressure-air-operated accumulators that eliminate the danger of handling high pressure gases and that store fluids at up to 10,000 p.s.i. for use when required, are being offered by Miller Motor Co., 4027 N. Kedzie Ave., Chicago

YOUR "SPECIAL BUSHINGS" May Be Our Regular STOCK ITEMS!



Ready for Immediate Delivery

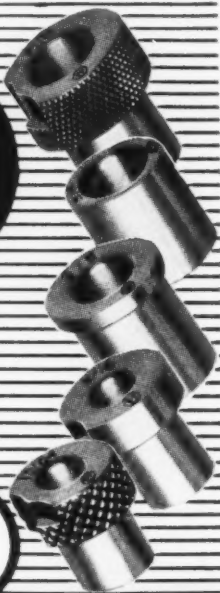
TWO complete bushing standards, the A.S.A. Standard plus our own Acme Standard, enables you to obtain bushings from stock that might otherwise require special manufacture. Results in faster delivery, lower cost. Write for catalog.



Acme Industrial Company

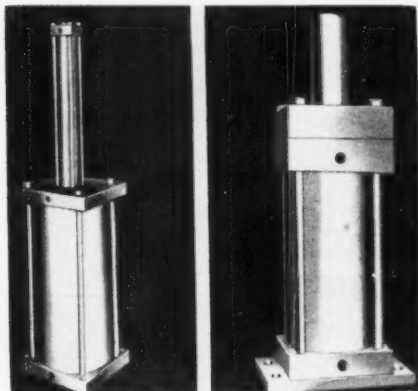
Makers of Hardened and Ground Precision Parts
210 N. Laflin Street • Chicago 7, Illinois

THE SERVICE SHOP TO INDUSTRY FOR MORE THAN 25 YEARS.



18, Ill., manufacturer of air and hydraulic cylinders.

Ordinary plant air at 60 to 200 p.s.i. is used as the compressible medium. In pump circuits, the oil flows from the pump into the accumulator during the non-demand pump cycle. The oil, under the high pump pressure, works against a hydraulic piston driving a larger air piston which, in turn, works against the low pressure compressible (air) medium. The oil is thus "stored" at pressures up to 10,000 p.s.i. for either immediate or later discharge, usually at high flow rates of short duration. They are generally used in this capacity on die casting machines, plastic molding presses, heavy machine tools, etc.



The sturdy, all metal construction of these accumulators adapt them for applications in which severe shock loads are encountered, as when the accumulator must completely unload itself in stopping and reversing the motion of a moving mass. Also, these units can be unloaded and reloaded at will. Thus, they can be employed in non-pumping applications, such as the loading of hydraulic die cushions, and in other applications where unloading for initial filling or for feeding new stocks is necessary.

Merely by changing their circuit connections, these units can be employed as "boosters", with either plant oil or air line pressure used as the input medium in developing up to 10,000 p.s.i. hydraulic output pressure for operation of hydraulic work cylinders. The units are offered in a variety of convenient sizes and mounting styles, and are built up from standard Miller air and hydraulic cylinder components that permit fast, economical production.

KIPP
Air Grinders



- **FASTER SPEEDS**
- **BETTER RESULTS**
- **LOW PRICES**

MODEL JA
50,000 R.P.M.
Weight 12 ounces; length 6³/₄ inches; chuck size 1/8 inch. Wheel guard removed for better illustration.

\$42
IN U.S.A.

THEY GRIND—NOT JUST RUB!

The RPM's stay up while grinding... not only when the grinder runs idle. It is an established fact that surface speeds must stay up to approximately a minute if you want to grind... not just rub. Every mechanic knows this, but an inexperienced buyer may order tools that maintain proper grinding speeds only when running idle. The speed of Kipp air grinders drops but slightly when put to work. That means better work... longer wheel life.

MADISON-KIPP CORP.

207 Waubesa St., Madison, Wis., U.S.A.

Write for KIPP Air Tool Catalog AT 3006

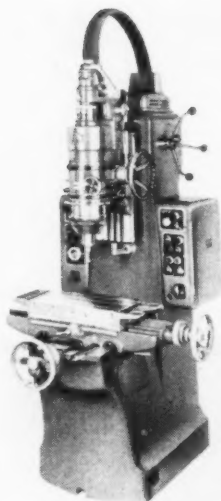
Moore Introduces Versatile Jig Grinder

Any contour, regular or irregular, as well as straight and tapered holes, can now be accurately ground with the No. 2 Model Jig Grinder recently developed by the Moore Special Tool Co., Inc., 728 Union Ave., Bridgeport 7, Conn. The new machine is the result of the experience of users of the No. 1 Moore Jig Grinder in accurate relocation and grinding of straight and tapered holes, as well as contours consisting of radii and tangents.

A new angular and indexing device built into the main spindle of the unit, and a new slot grinding attachment, now permit accurate grinding of any contour. The grinding capacity with grinding wheels is 3/16" to 5", and with diamond mandrels, is 1/64" to 3/16". More spindle power and infinite feeds up or down make possible chop grinding of contours. This method, in which the wheel contacts only a small part of the work, removes stock rapidly, reducing grinding time. Form grinding of die sections is also possible with these new features.

An infinite range of grinding speeds, from 12,000 to 60,000 r.p.m., allows more accurate control of grinding and stock

removal. Larger table size (10" x 19") and height, coupled with greater power, ex-



How SQUARE HOLED SLEEVES SPEED UP TOOL-MAKING!

One of the most difficult problems in tool making can be solved easily and quickly with Sturdy Square Holed Sleeves. The perfection of broached square holes can be had in boring bars, milling cutters and many other applications at a small fraction of the cost of imperfect hand-made square holes. The Sturdy Square Holed Sleeve consists of a round sleeve with a perfectly square hole broached through the center. The hole is tapped at one end to receive a back-up screw which is furnished with the Sleeve. The Sleeve can be sweated or pressed into a drilled and reamed hole to make a perfectly square accurate hole in a very few minutes.

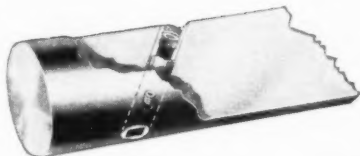
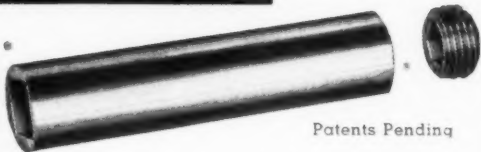
The Sturdy Square Holed Sleeve will save you many hours and many dollars in the making of boring bars, tool holders and other tools requiring square holes.

BUSHINGS MADE IN FOLLOWING SIZES:

3/16, 1/4, 5/16, 3/8, 7/16, 1/2, 5/8, 3/4, 1"

STURDY BROACHING SERVICE

23516 TELEGRAPH RD., DETROIT 19, MICH.



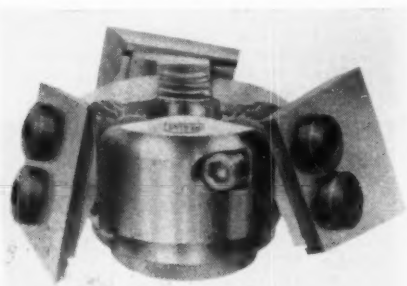
Write for Literature

tend the overall range of grinding operation.

Specifications of the Model No. 2 include five spindle speeds, with infinite feed of from 0 to 120 strokes. The main spindle travel slide is $3\frac{5}{8}$ ". The angular adjustment of the spindle is up to $1\frac{1}{2}^\circ$ either way, or 3° including angle. The radial offset of the grinding spindle is from center to $1\frac{1}{8}$ " off center by rough adjustment; while running .0001" adjustment for distance of .100" in the $1\frac{1}{8}$ " range. Standard equipment includes a 4-speed constant torque motor, 220/440-volt, 50/60 cycle, 2-3 phase; wheel dresser; micrometer stop; wrenches, and slot grinding attachment.

Cosa Introduces Reglus Milling Cutter

Another of the precision cutting tools made by the well-known Swiss firm of Reglus has been introduced to American industry by Cosa Corporation, 405 Lexington Ave., New York 17, N. Y. The new tool is the Universal Milling Cutter for the wood working industry, a precision tool for the milling of grooves, flutes and facets at any angle up to 75° . According to the manufacturers, many jobs which have heretofore required the use of several different tools and operations can be accomplished economically with the Reglus milling cutter.



The tool is set up on the molding machine, and the three molding cutters (see left in the picture) are brought into the desired position by turning the knurled adjustment nut; the three fixing set screws are then tightened, and the milling cutter is ready for use.

Specifications include a diameter with tilting angle of 0° , approximately 150 mm. (6"); the height of the molding cutters is approximately 70 mm. (2 $\frac{3}{4}$ "). The bore size is 30 mm. (approx. 1-3/16"). The tool operates at recommended speeds of up to 6000 r.p.m.



with "DE-STA-CO" ARBOR SPACERS and SHIMS

IT COSTS YOU MONEY when machinists waste time hunting for arbor spacers. **SAVE TIME** with two sets of "De-Sta-Co" Arbor Spacers for every milling machine in your shop.



ARBOR SPACERS
Keywayed



SHIMS
Not Keywayed

Handy sets available for 20 arbor diameters ($\frac{3}{8}$ " to 4"), 19 graduated thicknesses (.001" to .125") with standard keyway. Shims same sizes, without keyway. Sets sealed in clear polyethylene envelopes, with size plainly marked. Specials, over .125" thick, available in popular arbor sizes and thicknesses, machined from bar stock, hardened and ground, with standard keyways, identified as to thickness.

Machinists prefer durable "De-Sta-Co" steel Arbor Spacers and Shims for milling, slitting and gang-saw setups and for shimming gears and bearings. **YOUR SHOP SAVES**, too, when each machine has two sets handy for speedy setups. Ask your mill supply house for them by name, "De-Sta-Co", or write for Spacer and Shim Stock Price List.

DETROIT STAMPING COMPANY

347 MIDLAND AVE. • DETROIT 3, MICH.

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Set them with one hand instantly for any gap from wire size to more than two inch opening. Ideal for water pumps, crank case plugs, brake cams, pipes, etc. High quality chrome vanadium steel, 9½ inch length for ample leverage. Double-pivot action for increased **parallel jaw** power. Normal hand gripping at all jaw openings. Ask your dealer or order direct by check or money order. (No C.O.D.'s, please). Price postpaid anywhere in U.S. \$3.50.

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- WOODRUFF KEYS
- MACHINE KEYS
- MACHINE RACK
- TAPER PINS
- COTTER PINS
- SPECIAL PARTS

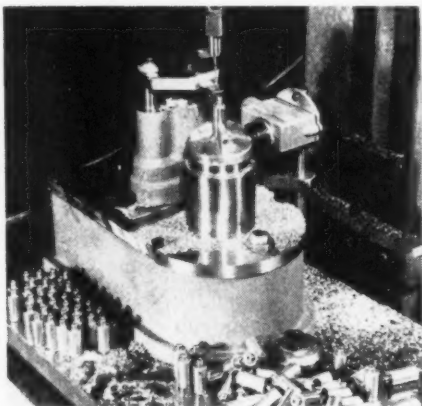
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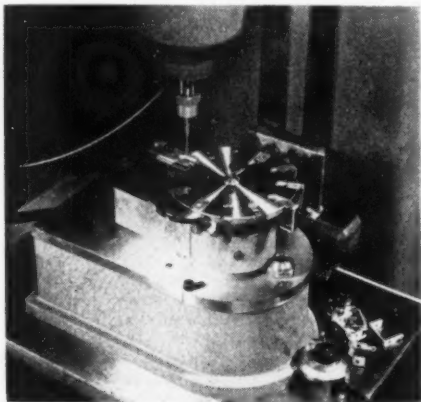
STANDARD
Since 1872 **HORSE NAIL CORP.**
NEW BRIGHTON, PA

Versatile Horizontal Index Fixture

The Snow Manufacturing Co., 435 East-ern Ave., Bellwood, Ill., has developed an addition to its line of automatic and semi-automatic Master Fixtures. Versatility is incorporated into the design of this No. 14 Horizontal Indexing Unit, to permit a wide range of tooling application for drilling, reaming, countersinking and tapping operations.



Typical parts and operations that may be handled on the new Index Fixture are depicted in the illustrations above and below, showing awkward stampings that could not be rapidly dial fed previously without considerable expense.



The design of this new "Master Fix-ure" is said to simplify tooling to a con-siderable extent. High production can be

obtained through its ease of change-over, set-up, loading and unloading. Handling time is stated to have been cut to a minimum.

Also shown are multi-hole drilling operations requiring accuracy of spacing. These are tooled to allow one operator to feed three or four machines. The operator merely inserts the piece and starts the drilling cycle which continues automatically until all of the holes have been drilled, and then stops. Meanwhile, the operator loads and unloads the other machines.

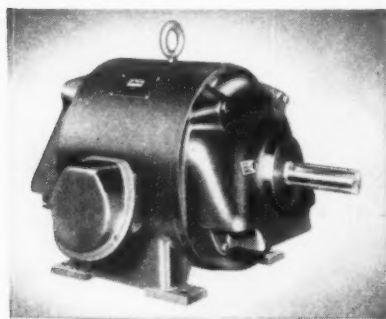
While these fixtures were primarily developed for use on the Snow Full Universal Drilling, Tapping and Threading Machines, they have found wide application on other equipment and in other fields.

Splash-Proof Squirrel-Cage Motors

New splash-proof type CSP Life-Line induction motors are available from Westinghouse Electric Corporation, P. O. Box 2099, Pittsburgh 30, Pa. These squirrel-cage motors are designed for constant speed applications both indoors and outdoors.

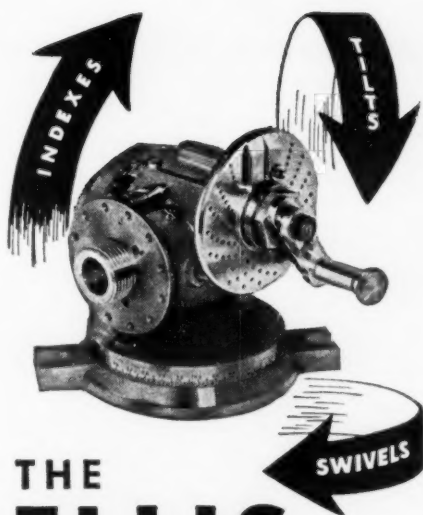
They are fully protected from dripping or splashing liquids by solid rolled-steel frames and baffles in the end brackets.

These motors are equipped with pre-lubricated bearings. No lubrication is required for the life of the bearing.



Typical applications of these motors include food-processing and chemical plants, boiler rooms, oil fields, refineries, and similar places where splashing liquids are frequently encountered.

This new series of squirrel-cage type motors has a horsepower range of from $7\frac{1}{2}$ to 100 h.p. The motors are available in 60, 50 or 25 cycles, and have voltages of 208, 220, 440, 550 and 2300 volts. They are supplied in standard NEMA frame dimensions, 364 through 445.



THE ELLIS DIVIDING HEAD

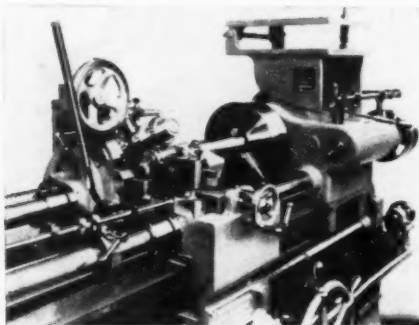
Many unique features make the ELLIS Dividing Head more than an ordinary indexing fixture. It is a precise, rugged unit with $6\frac{1}{2}$ " normal swing increased to 11" swing through the use of riser blocks. It TILTS more than 100 degrees in the vertical plane—SWIVELS 360 degrees in the horizontal plane—INDEXES by crank, or directly by hand. Work is held between centers, or in chucks or collets. The ELLIS Dividing Head is a universal work head that will increase the production versatility of your milling machines, grinders, drill presses and jig borers—write for complete details today.



50-G CHURCH STREET NEW YORK 7, N. Y.

Scherr Introduces Cornelis Thread Generator

Another example of the fine European machine tools and precision instruments which are being introduced to the United States by George Scherr Co., Inc., 198 Lafayette St., New York 12, N. Y., appears below. It is the Cornelis Thread Generating Machine, manufactured by



the highly respected firm of Cornelis, in Liege, Belgium.

This precision unit is intended for cutting leadscrews, worms and threads by

means of a generating method which uses a circular cutter. The principle employed differs considerably from the known methods of milling, lathe cutting or die chasing. Single thread or multiple start threads are cut in a single operation; there is no indexing required, thus eliminating spacing errors completely.

The thread action of the Cornelis Thread Generator is smooth; the shape of the thread is generated with precision, and no special skill is required to operate the machine. Four standard lengths are available: 18", 37", 77" and 116" capacity, 4½ diameter, 4 d.p., 30° maximum helix angle, 3 h.p. motor required.

Griswold 16" Rotary Index Table

A new 16" diameter rotary indexing table, as an addition to its present line of OPL optically controlled measuring devices has just been introduced by F. T. Griswold Manufacturing Co., 305 W. Lancaster Ave., Wayne, Pa.

The new model table was designed to provide the extra capacity and rigidity necessary to machine the heavier run of jobs encountered in present day tool rooms. It is intended for use on the

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SAVE SPACE Sterling Racks utilize rent-free air space . . . keep your parts and tools neat and orderly.

SAVE TIME Materials "filed" in Sterling Racks are always available — upper and lower boxes equally accessible.

SAVE MONEY Sterling Racks cost you about 1/3 less per opening than individual racks.

Made to fit your present shop boxes or boxes supplied. Available in five section units of rigid construction—Prompt Delivery. Write today for literature and prices.



Sterling Racks and boxes in modern stockroom. These five foot sections are convenient for shipping, assembling, and relocating.

Drawing shows how top and bottom frames are bolted to uprights. Racks are shipped knocked-down.

Sterling Factory Equipment Co., 187 Charles St., Providence, R. I.



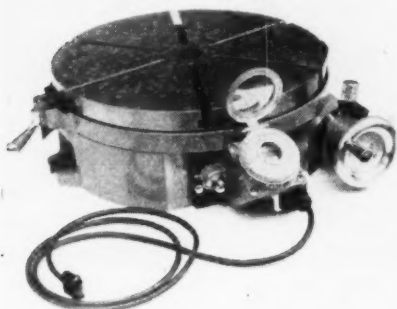
Sterling

Quality Handling & Storage Equipment



larger sizes of milling machines, jig borers and grinders.

The OPL Model 16 is stated to be a high precision indexing device: it is set entirely by means of the built-in optical control which enables angular settings in degrees, minutes and seconds to be made from a master graduated reference drum enclosed within the table, and solidly mounted to the rotating platen. The



master reference drum being of large diameter, it permits accurate angular movements to be made with ease, according to the manufacturer. Spindle runout is held to within .0002", and the maximum error of indexing will not exceed .0005", measured at the periphery of the 16" working diameter platen.

Specifications of the table include an overall height of 53 1/4"; the weight of the unit is 175 lbs. The body of the indexing table is of alloy cast iron. The platen is clamped throughout its entire circumference; a de-clutching device is provided for the platen drive. All mechanism of the table is sealed from dirt and oil. Convenient T-slots are provided for work mounting.

New Bay Metal Stacking Box

Bay Metal Products, 3003 N. 16th St., Philadelphia 32, Pa., has recently introduced a new standard size Stacking Box said to be useful for a wide variety of purposes in plant maintenance departments, stock rooms, etc. Its measurements are 10" x 18" x 6"; it is available in both 18 and 16 gauge steel.

Special features of the new Bay Stacking Box include reinforced corners, a drop handle at each end, spotwelded construction, four rivets for extra strength, and a continuous stacking rim on all four sides of the box.



REYNOLDS

MULTIPLE SPINDLE

Screw Driving Machines

Speed up production and reduce costs by driving from 2 to 6 screws at a time with Reynolds Multiple Spindle Screw Driving Machines.

A complete line of production type Screw Driving Machines for every application.

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COOK & CHICK CO.
 640 S. MILLER ST. CHICAGO 7, ILL.

Micro

Supreme

LAY-OUT AND IDENTIFICATION DYE



13 COLORS

For Tool, Die, Pattern or Template layout on metal . . . Quick identification of bar stock, sheet, strips or parts . . . Shows up in sharp relief—dries instantly . . . Write for trial sample and circular.

MICHIGAN CHROME & CHEMICAL COMPANY
 6340 E. Jefferson Ave. • Detroit 7, Mich.

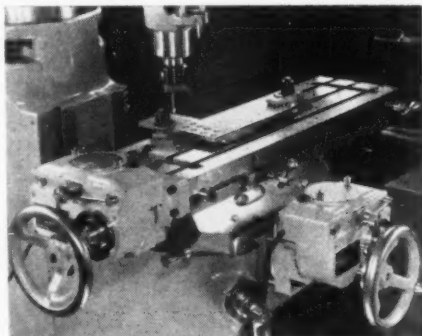
Benzon Coordinators for Hole Positioning

An ingenious new device for locating and reproducing a pattern of holes by means of preformed records cut on cylinders has been developed by the Benzon Machine Co., 7th St. and Washington Ave., Lansdale, Pa. These new hole positioning attachments are known as Coordinators. According to their manufacturer, "the fundamental object in applying Coordinators to machine tools is to control hole positioning for **interchangeable parts** with a minimum expenditure of time and money and with a maximum insurance against operator error."

Coordinators are offered as attachments to vertical and horizontal boring machines, vertical milling machines, etc. They are said to compensate for errors in the pitch of traverse screws and racks in applications where the errors are beyond required tolerances. The devices contain no scales, verniers, rods or other conventional measuring devices.

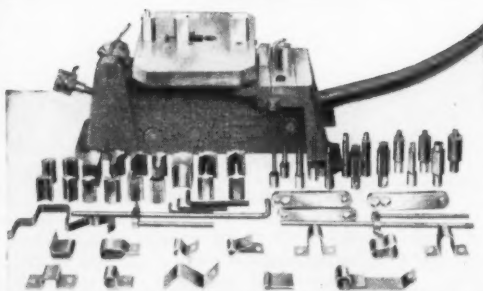
For positioning machine elements accurately, quickly and repeatedly, the Benzon Coordinators are said to be particularly useful. The accuracy is controlled by pre-formed Micro-Patterns,

and does not depend upon the skill of the operator. Micro-Patterns are cut and checked on a recorder, a portable machine that requires only the ability to transfer dimensions from drawings to dials—no particular mechanical skill or experience. With the Micro-Patterns



mounted in the Coordinator, the operator can then set the machine to every hole-position recorded, with a high degree of accuracy, without the necessity of repeated reference to a drawing or to other conventional measuring means.

THE MULTIFORM *Bender*



NO SPECIAL TOOLING

Bends & Cuts — Flats
— Rounds Into Any Shape
— Brackets — Clamps —
Bus Bars — Springs — Wire
Forms — Aircraft Work —
Steel Rule Dies, Etc.

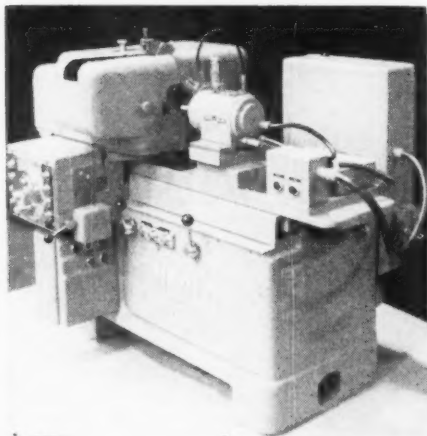
**A PROFIT PRODUCER IN
ANY PLANT**

J. A. RICHARDS CO.
DEPT. 5B, KALAMAZOO, MICHIGAN

Beginning with a hole lay-out, the position on the table of the fixtures or stops for the plate is predetermined; the sequence of positions indicated is based on grouping the several holes of the same size into individual groups. All holes can be center-drilled first, and each group can be finished in individual sequence. Two removable plates on top of each Coordinator, one red, the other blue, are placed on top of the corresponding color charts. At the top of the opening is shown the position at which the Coordinator is set. The large sections of the control chart are provided for showing positions on the other Coordinator which are to be combined.

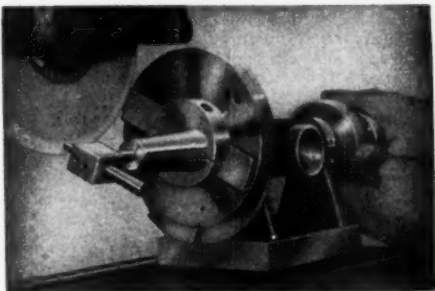
Heald Centerless Internal Grinder

The Heald Machine Company, Worcester 6, Mass., offers its new Model 180 Centerless Internal. This machine is designed for battery installation and features a central hydraulic system. Central coolant supply adaptation as well as central power source for optional Hi-Frequency equipment are also available.



Where large volume production is required, these battery type installations have proved extremely profitable, according to Heald. Because these Centerless Internals are completely automatic, several machines can easily be tended by a single operator. And since all machines operate from a single central hydraulic power unit, these battery type installations are said to offer important savings in initial investment, maintenance and operating costs.

NO MEASURING PINS • NO WEAR • NO GUESS



Absolute precision with one setting for any two angles, as well as set radius. Especially adapted for angle tangent-to-radius wheel dressing.

95% of all emery wheels in Michigan dressed on Last Word Dresser. For your precision wheel dressing this is the . . . LAST WORD.

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LAST WORD SALES and ENG. CO.

P.O. BOX 287

ROYAL OAK, MICH.

HIGH SPEED AUTOMATIC STAKING MACHINES



Cut your assembly costs with **HIGHSPEED** for staking or riveting fixed or movable joints at a rate of more than 1000 pieces per hour. Foot treadle . . . safe . . . uniform adjustable hammer blow.

COLD RIVETERS

Let us send you a free survey of your riveting problems. Send samples of your work completed to the riveting stage. We'll return them along with guaranteed production data. No obligation . . . write today.

HIGH SPEED HAMMER CO., INC.



311 Norton St.

Rochester 5, N.Y.

Power Operated Scale Marking Machine

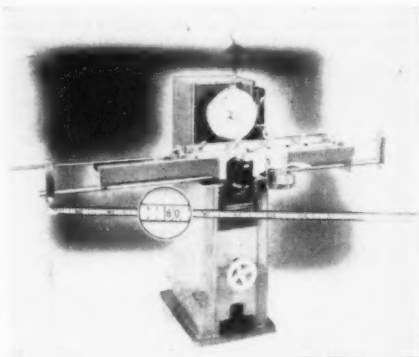
The Noble & Westbrook Mfg. Co., East Hartford 8, Conn., announces the development of a new scale marking machine, Model No. 306, for rolling lineal graduations and numbers permanently into articles which are made of metal; the same machine is adaptable not only for metal marking but on plastics, wood or other materials as well.

This machine utilizes a steel roll-marking die which produces the sunk inscription into the work piece, resulting in high accuracy, the manufacturers state. The machine will mark lengths up to feet at speeds up to a production of 300 lineal inches per minute.

In the roll-marking operation, where the marking is accomplished by single-point contact between the roll marking die and the work piece, a relatively low pressure against the work piece is adequate so that minimum strain is applied to the work piece with negligible distortion. The roll-marking operation is, therefore, much preferred, especially on thin materials.

An air-operated work table brings the work piece into contact with the mark-

ing die which is mounted on a special geared motor drive on the main die spindle. The air provides marking pressure and the depth of mark can be controlled by setting the air gauge of the pressure



regulator to the proper point. In addition, the air also compensates for variations in thickness from one part to another and compensates for surface irregularities to produce a uniform inscription depth.

LOWN SLIP ROLL FORMING MACHINES



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Model B-400
4" diameter

- Initial Type-Power Driven.
- Rolls 4" diameter.
- Oilite bearings - Alemite lubrication.
- New type quick acting latch on drop arm.
- Hand wheels on adjusting screws.
- Roll position indicators.
- Fast, sturdy and easy to operate.
- Prompt Deliveries.

• Other size machines also available.
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SAN ANGELO FOUNDRY & MACHINE CO.

San Angelo, Texas 1000 E. Upton.

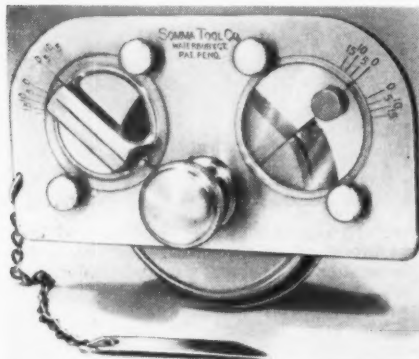
The motor driven roll-marking die is geared to a rack on the work carrier and the work carrier is mounted on roller bearings in the ways of the work table. Rotation of the die spindle drives the work carrier laterally under the marking die which rolls the inscription in the work piece under pressure from the table of the machine.

The machine is furnished complete with motor drive, starter and reversing switch and with pneumatic controls for connection to existing air lines having 80 lbs. pressure.

"Scribe-Chek" Form Tool Gage

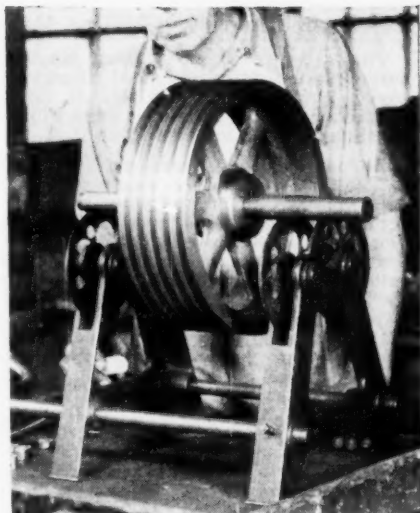
A new cutting-edge gage for circular form tools, called "Scribe-Chek", is offered by Somma Tool Co., Inc., 20 Brown St., Waterbury, Conn.

The "Scribe-Chek" has been carefully designed to take the guesswork out of sharpening circular form tools. With this new gage, the exact cutting edge desired can be scribed on the tool, either with or without top rake. It also affords the operator a perfect visual check and simplifies the entire tool sharpening operation.



The device not only assures guaranteed accuracy but will save machine down time and operator's time, thereby increasing the number of correct pieces per grind. Longer tool life can be expected by using the "Scribe-Chek", since the tool can be properly sharpened the first time. Operators will find that expensive trial and error tool sharpening methods are a thing of the past with this economical, time-saving gage, according to Somma Tool Co.

The "Scribe-Chek" at present is designed for operation on circular tools on Brown & Sharpe Machines.



There's a **RIGHT BALANCING TOOL** for Your Work in Sundstrand's Complete Line

Our complete line of sensitive balancing tools includes eight different sizes and types. They are widely used on automobile tires, cotton gin brushes, crankshafts, flywheels, cones, pulleys, polishing wheels and other products. You'll find the balancing tool best suited to *your* work in this line of eight different sizes and types.

CAPACITIES

Swing	Between Standards	Weight Capacity
21 in.	20 in.	12 lbs.
21 in.	20 in.	800 lbs.
43 in.	29 in.	800 lbs.
43 in.	29 in.	2,000 lbs.
6 ft.	5 ft.	5,000 lbs.
8 ft.	8 ft.	10,000 lbs.
Any	Any	24,000 lbs.
43 in.	30 in.	800 lbs.

FREE DATA



You can obtain complete information on Sundstrand Balancing Tools by writing for bulletin No. 99



Sundstrand Machine Tool Co.
2535 Eleventh St., Rockford, Ill., U.S.A.

Cincinnati Offers New Milling Machines

The new No. 3 MI Milling Machine, built in plain and universal (illustrated) styles, and powered by a $7\frac{1}{2}$ h.p. motor, is announced by The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

Sixteen spindle speeds, ranging from 25 to 1500 r.p.m. are changed with a single crank type control, operating a hydraulic selector valve, while the actual work of shifting gears is performed hydraulically. One half-turn of the crank, rotates the dial to the right or left to the next numeral, and meshes the proper gears for that speed. Numerals on the dial are black on white, and $9/16$ " high, assuring clear visibility. While the spindle is rotating, a safety interlock prevents the speed change crank from being moved. A mechanical spindle reverse offers a quick, easy reversal of spindle rotation to suit the "hand" of the cutter, but has no effect upon the direction of feeds.

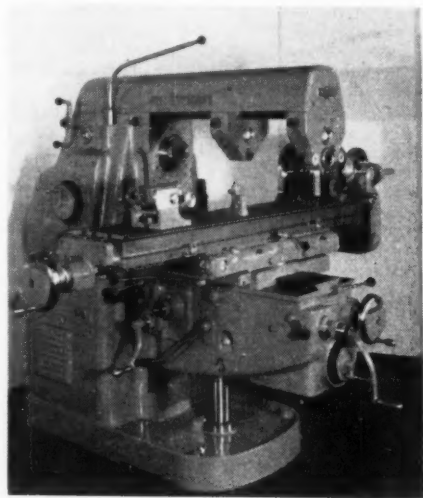
Feed rates are changed in the same manner as speeds throughout the complete range of sixteen feeds, from $1/4$ " to 30" per minute. The crank and indicating dial are located at the front of the knee, available for rapid changes of feed rates. The spindle runs on three anti-friction bearings, precision tapered roller at the front and center and a straight roller bearing at the rear. Extra metal on the bull gear produces a flywheel effect; a desirable quality when using sintered carbide and single tooth cutters, or end mills having widely spaced teeth.

All operating controls are duplicated at the rear working position, left-hand side of the column. This is a standard feature.

The main drive clutch is a single disc dry plate unit, with accessible adjustment. A multiple disc spring-loaded brake, operated by the disengaging action

of the starting lever, stops the spindle instantly when the drive clutch is disengaged.

Parts within the column and knee are automatically lubricated from individual pump and cascade systems, with tubing carrying oil to out-of-the-way bearings. The pump in the column also supplies oil under pressure to the hydraulic gear shift mechanism. Its intake is through a tubular strainer which may be removed for cleaning.



Feed controls are directional and independent of each other, and each feed lever has a forward, neutral, reverse position. All are equipped with plastic knobs for convenience of the operators. Knee and saddle clamping levers, the



THE ORIGINAL

PYRALIN-TIPPED MALLETS WITH REPLACEABLE (BY HAND) THREADED TIPS

Now you can effectively avoid marring metal and plated finishes! Use the new Pyralin (plastic) tipped mallets . . . the only pyralin mallet with the threaded tip replaceable by hand. Plastic tips . . . solid alloy head threaded at both ends! Since 1939, Southwest has led the field. Send today for free illustrated literature and low prices. Send \$1.00 for sample prepaid mallet.

SOUTHWEST MFG. CO.
1615 1st ST. SANTA ANITA, CAL.

starting lever, and the overarm pilot wheel have similar plastic knobs.

"Live" rapid traverse, at the rate of 150" per minute longitudinal and cross, and 75" per minute vertical, may be engaged through a lever control at the side of the knee. This is a time saving feature when the machine is used for production work.

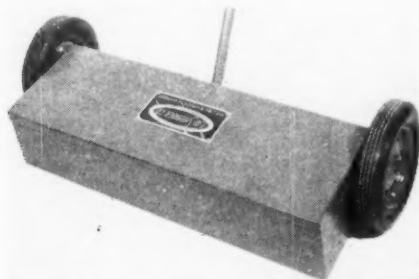
The main drive clutch, brake, and all spindle drive gearing up to the back gear shaft is contained in a unit bolted to the rear wall of the column. Likewise, feed drive gears are contained in a unit bolted to the underside of the knee. This type of construction facilitates maintenance.

All rotating shafts are completely covered to protect the operator, in addition, the cross screw is also covered, for protection against the wearing effects of dust and chips. Many attachments are available, including circular milling tables, several types of vertical and universal spindle attachments, motorized overarm, and long and short lead driving mechanisms.

Permanent Magnet Clean-Up Unit

A new permanent magnet clean-up unit made of high grade magnet material and designed for use in lumber yards, garages, machine shops and any hard-surfaced area where nails, bolts and scattered ferrous materials must be removed from floors or aisles, is announced by F. W. Shrader Co., 5788 Washington Blvd., Culver City, Calif.

The clean-up unit is available in two models to fit varying needs, one 24" wide, and the other 36" in width. Both units are suitable for use on smooth or reasonably uneven surfaces.



The clean-up unit is easily maneuvered in areas where ferrous material must be picked up. A special feature is the lever-operated clean off device, by means of which the load may be dropped with a flip of the handle, cleaning the material from the magnet.



**NEW
TAP or DRILL
UNIT by
THRIFTMASTER**

FEATURES...

1. Attaches to any Drill Press
2. Automatic reverse for tapping
3. Drills on same set up
4. Spindles adjustable to infinite variety of patterns
5. Increases drilling and tapping production 2 to 6 times proportionately . . . Lower cost
6. Light or heavy duty up to 1" capacity—2 to 10 spindles

**ALSO
COMPLETE LINE
ADJUSTABLE AND
FIXED CENTER
DRILL HEADS**

Subsidiary of Thomson Industries, Inc.

THRIFTMASTER PRODUCTS CORPORATION
 Division of Thomson Industries, Inc.
 1030 N. PLUM STREET, LANCASTER, PA.
 STANDARD UNIVERSAL ADJUSTABLE AND SPECIAL FIXED CENTER DRILLHEADS

GEARS

Small and Medium

SPURS
(internal and external)

HELICALS

STRAIGHT
BEVELS

SPROCKETS

RACKS

WORMS

WORM
GEARS

THREAD
GRINDING



COMPLETE
GEAR
TRAINS

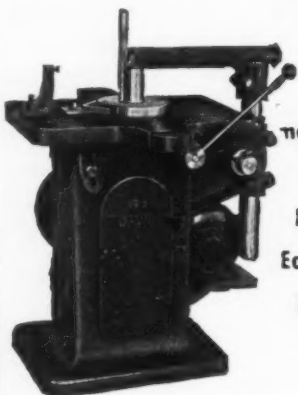
Send us your blueprints for estimate

BEAVER

GEAR WORKS, Inc.

1033 Parmelee St., ROCKFORD, ILL.

"DAVIS" KEYSEATERS



are
moderately
priced
Efficient
Economical
Durable

Built in 3 sizes for cutting keyways 1/16" to 1" width. Circular upon request.

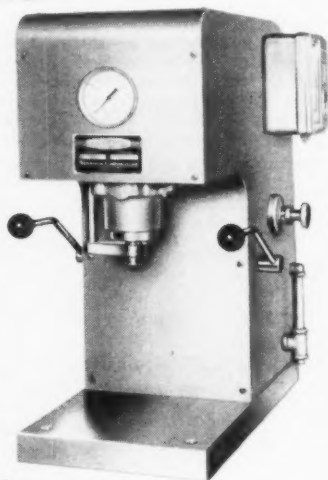
DAVIS KEYSEATER CO.

407 1/2 Exchange St. Rochester 8, N. Y.



Hannifin Hydraulic "Han-D-Press"

To its line of air-operated "Han-D-Presses", Hannifin Corporation, 1130 So. Kilbourn Ave., Chicago 24, Ill., is adding a hydraulic "Han-D-Press," available as the F-10 (1-Ton) illustrated, or as the F-20 (2-Ton). It was designed to meet the need for a fast-acting, precision unit



to help speed up light production operations, such as staking, marking, broaching, punching, riveting and press-assembly. The new hydraulic "Han-D-Press" is completely self-contained and can be used where compressed air is not available.

Mechanical, dual controls are standard, and tamper-proof. Should an operator tie down either control (so as to operate the press with one hand), the ram will advance on the first stroke thereafter but will not return, making it impossible to complete the cycle. This same non-return feature when one of the two operating levers is held down makes it possible to "inch" the ram to any desired position and hold it there during set-up work. A 1 1/2 h.p., 1800 r.p.m. motor, available in any standard voltage, operates a 3.3 g.p.m. constant-volume pump. An adjustable relief valve permits maximum ram pressure adjustment, as shown on the gauge directly in front of the operator, to any setting from 10% of capacity to full, rated capacity.

Stroke of the new press is 6", and gap is 10". The reach is 6", and overall height above the bench is 28". The base is re-

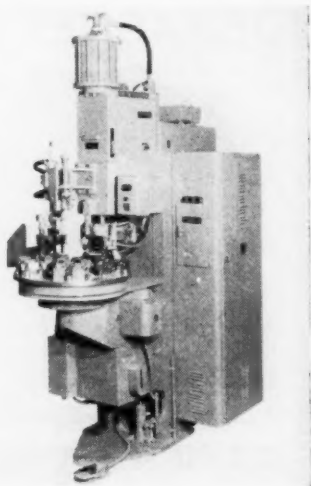
movable, making it possible to increase gap with a rectangular spacer to any desired measurement. The press is also available without base, and a number of these presses can be mounted on a common slab, if desired. Ram speed in the F-10 (1-Ton) model is 400 i.p.m.—800 i.p.m. return. The complete unit, including base, weighs less than 500 lbs.

Dual Ram-Type Resistance Projection Welder

The Resistance Projection Welder manufactured by Taylor-Winfield Corp. Warren, Ohio, is complete with motor driven geneva indexing table, electrical controls and automatic air operated "pick-off" work ejector. With no current-carrying bearings, it is a dual ram type welder with five stations and ten dies welding two assemblies simultaneously.

This machine projection welds a mounting plate of 16-gauge low carbon steel to a telephone part box of 18-gauge low carbon steel. This box contains electrical parts and is considered disposable in case of breakdown. This makes important the increased production of approximately 1600 assemblies per hour as

against 400 assemblies per hour on a standard projection welder. Welding



labor costs are now only 25% of previous rate with this dial feed projection welder.

For ANY Size Machine

Chandler-Duplex

COMBINED Boring and Facing Toolhead

A Boring Head That Won't Face Is NOT Complete

POWER FEED FOR FACING CUTS

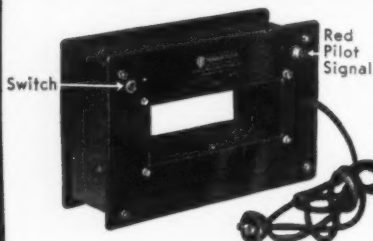
A Few Openings For GOOD Distributors

Accuracy -- Stamina

WRITE TODAY For Complete Details

CHANDLER TOOL CO
MUNCIE, INDIANA, U. S. A.

AMC Quick DEMAGNETIZER



A necessity where machine tools are used.

Standard units available.

Write today for descriptive circular.

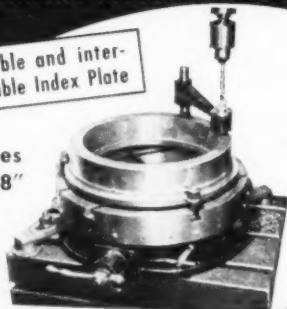
ALOFS MFG. CO.

1629 Madison, Grand Rapids, Mich.

Eliminate Costly Jigs with a TROYKE BALL BEARING INDEXING TABLE

Removable and inter-
changeable Index Plate

Three Sizes
12" - 15" - 18"



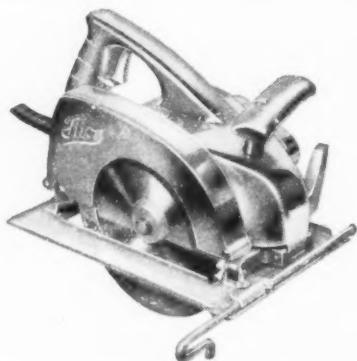
See your dealer or write
for Catalog No. 14

Troyke Mfg. Co. Inc.
Cincinnati 9, Ohio, U.S.A.



Thor 6" Portable Electric Saw

A new, 6" Thor portable electric saw with the same heavy duty construction and exclusive features included in larger models in the company's new "Silver Line" is announced by Independent Pneumatic Tool Co., 175 No. State St., Aurora, Ill.



Features of the new saw include a long shaft transverse motor mounting for extra power and longer life—no power-wasting worm or bevel gears; die cast aluminum housings; steel inserts for bearings and threads to maintain critical parts in permanent alignment; a built-in saw blower, which blows from the inside and keeps the cutting line clear and motor free from dust; a steel rip guide with adjustments for any thickness or material being cut; giant switches, largest ever built into saws give positive protection against accidental starting; smooth operating automatic ball bearing blade-guard with rubber snubber; finger-tip control for depth and bevel cuts (no wrenches needed); complete ball bearing construction and convenient handles for better balance and easier handling.

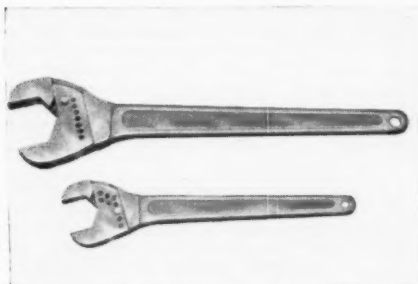
New Owatonna Adjustable Wrenches

Two alloy steel, drop-forged adjustable wrenches, embracing larger sizes not heretofore included in this type of wrench, are announced by the Owatonna Tool Co., 382 N. Cedar St., Owatonna, Minn.

These two wrenches adjust to 29 sizes which are normally serviced by fixed size, carbon steel wrenches. The smaller wrench, No. 0A-24 is 24" long, $\frac{7}{8}$ " thick and weighs only 10 pounds. The larger wrench, No. 0A-36 is 36" long, $1\frac{1}{8}$ " thick and weighs only 22 pounds. The smaller wrench adjusts from $1\frac{3}{8}$ " to $2\frac{7}{8}$ " while

the larger tool adjusts from 2-15/16" to 4 3/4".

These wrenches reduce the weight and bulk usually necessary for a service or



maintenance man to carry. They save time, are easier to use and are claimed to cost less than fixed size wrenches covering the same range of sizes.

Broaches for 7/8" and 1" Keyways

New "Minute Man" Keyway Broaches for cutting large size keyways 7/8" and 1" wide are offered by The du Mont Corporation, Greenfield, Mass. The picture below shows the new 1" broach with a 1/16" broach, to give an idea of relative size.



As shown, the larger broaches are equipped with staggered teeth to provide ample chip room for heavy cuts in long bores. The cutting teeth are ground with a sufficient number of chip breakers to reduce the amount of pressure to push the broach through the bore. The shank end of these large broaches is provided with a 1/2" reamed hole for quick locating and alignment of an extension shank. A shank is furnished with each broach.

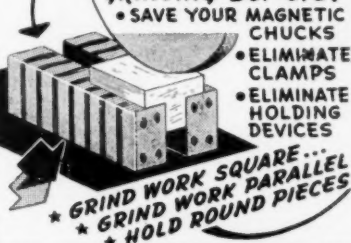
With the addition of the large broaches, this quick and efficient method of cutting keyways covers all widths from 1/16" to 1". The broaches are designed to conform to ASME standards.

WHEN ACCURACY COUNTS...

Contact SCHERR!

MAGNE-BLOX

SPEED SURFACE GRINDING SET-UPS!



- SAVE YOUR MAGNETIC CHUCKS
- ELIMINATE CLAMPS
- ELIMINATE HOLDING DEVICES
- * GRIND WORK SQUARE...
- * GRIND WORK PARALLEL...
- * HOLD ROUND PIECES...

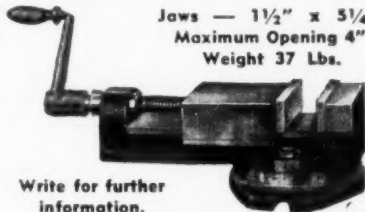
**• EVERY MAN CAN OWN HIS OWN •
WRITE FOR ILLUSTRATED FOLDER**

GEORGE SCHERR CO., INC.
COMPLETE LINE OF PRECISION INSTRUMENTS
198 LAFAYETTE ST. • N.Y. 12, N.Y.

NEW BRITAIN

SWIVEL VISE

Jaws — 1 1/2" x 3 1/4"
Maximum Opening 4"
Weight 37 Lbs.



Write for further information.

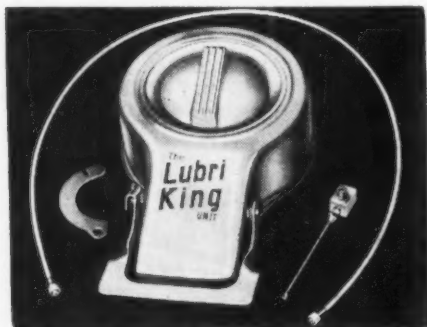
The body is made of semi-steel; the jaws of tool steel hardened and ground. All working surfaces are ground. The vise is as accurate as is possible and the degrees are cut to very close limits.

NEW BRITAIN TOOL & MFG. CO.

NEW BRITAIN, CONN., U. S. A.

Foot Powered Coolant Pump

A new coolant supply unit for use on drill press, tapping machine, milling machine or bench, employing a foot-powered pump, has been introduced by the W. A. Horejsi Company, 2001 James Ave., No., Minneapolis, Minnesota.



The unit consists of a heavy steel tank holding approximately two gallons of lubricant or coolant, equipped with a foot pump, 5 feet of oil-resistant plastic hose, and nozzle attachment with bracket that can be quickly attached to practically

any machine. The stroke of the foot pedal on the pump controls the amount of fluid delivered to the cutting tool, which can be as little as a few drops or a stream strong enough to wash the chips out of the taps, etc. The unit eliminates the use of oil-cans and brushes for applying lubricant or coolant, thereby speeding up machine operations and saving on tools. Where an operation requires a large volume of fluid, the fluid can be returned to the tank, where it is strained through a 50-mesh screen, included as standard equipment.

The Lubri-King unit weighs less than 10 pounds empty, and can be easily moved from one machine to another. The tank is made of 20-gauge steel, and the pump, check valves, and fittings are of brass.

Keller Air Line Lubricator

To provide automatic lubrication for tools using from 10 to 60 c.f.m., Keller Tool Co., Grand Haven, Mich., announces a new Air Line Lubricator in two sizes.

With the larger size, lubrication of one or more tools is automatically accomplished, where a minimum of 10 c.f.m. is used by one tool and a maximum of 60

Anderson

PILLOW BLOCK BALANCING WAYS

Especially suited for large diameter work, as a sub-base can be made of proper height to give necessary clearance for work. Anderson Pillow Block Balancing Ways are precision built with chilled iron discs which rotate with minimum friction on sensitive special bearings. Many manufacturers have endorsed them for profitable, efficient, static balancing.



**Built in 1,000, 2,000, 5,000, 10,000
and 20,000 Capacities**

Write for Bulletin 7-5

ANDERSON BROS. MFG. CO., Rockford, Ill.

Balancing Ways, Roto Checkers, Hand and Power Scrapers, Spotters, Hand and Power Hydraulic Straightening Presses



c.f.m. by all tools taking air through the lubricator.

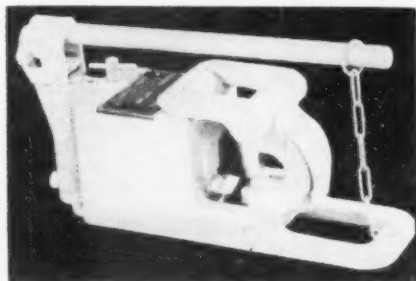
A transparent Plexene bowl, designed to hold 6 oz. of light oil, provides oil feed through a porous bronze wick. When used with a 35 c.f.m. tool, the bowl holds enough oil for 8 to 10 weeks of lubrication under normal usage. No regulation of the oil flow is necessary.

"Each tool," the manufacturer states, "will receive the proper amount of lubricant. The quantity of oil dispensed into the air stream is dependent upon the amount of air passing the wick. Several tools operating from one lubricator will automatically draw more oil than just a single tool. Under normal conditions, pressure drop through the lubricator will not exceed 1 lb. p.s.i."

Installation of the new Air Line Lubricator is made by screwing the device into a 1/2" air line ahead of the tool to be lubricated. A removable hex nut with holding chain permits easy refilling.

Wire Rope Cutter Has 3/4" Capacity

Announcement of new "Model W" to its line of Hydrashear Wire Rope Cutters has just been made by the Pell Cable Cutter Co., 55 New Montgomery St., San Francisco 5, Calif. This new Hydrashear is designed especially for use with cable-controlled equipment, for elevator repair work or wherever a small, portable, lightweight cutter is required.



The "Model W" weighs only 18 pounds, yet is said to be able to cut any type and size of wire rope up to and including 3/4" diameter. It is only 12" long, 3 1/2" wide and 6" high; it is self-contained and requires no outside power or additional tools.

This new unit is of all-steel construction, and due to a new design for the cutting blade, requires less effort to operate. It can be used in any position, even for cutting wire rope under water.

REID SURFACE GRINDERS



THE PRECISION
CHOICE OF WORLD-
WIDE INDUSTRY



1900 - 50th - 1950
Anniversary

REID BROTHERS CO., INC.
Beverly • Massachusetts

Memo re: STEEL STAMPS & MARKING DEVICES

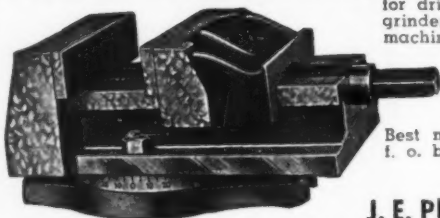
That Newco bevel on New Method's does a swell job of giving clear markings with less effort and longer stamp life.

Better get a copy of their catalog and look it over for ways and means to cut our marking costs.

Write to:

NEW METHOD STEEL STAMPS, Inc.
149 Joseph Campau, Detroit 7, U.S.A.

PLUNKET IMPROVED VISES



We make a complete line of modern vises for drill presses, shapers, milling machines and grinders. Illustration shows our standard milling machine vise as regularly furnished and stocked.

In ordering this vise give size of slot in table:

No. 10-6" jaws, 1 1/2" deep, opens 5".

wt. 45 lbs. \$62.00

No. 20-10" jaws, 2 1/4" deep, opens 8 1/2".

wt. 120 lbs. \$84.00

Best material and workmanship. Prices are net f. o. b. Chicago. Dealer's inquiries are solicited.

Write for folder TODAY.

J. E. Plunket Machine Co. 1823 W. LAKE ST.
CHICAGO 12, ILL.

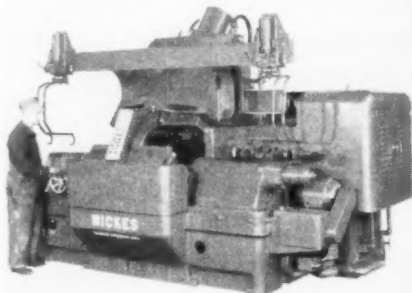
Wickes Automatic Crankshaft Lathe

The new Model CF-4 automatic rough-and-finish turning center drive Crankshaft Lathe has recently been introduced to the industrial field by Wickes Brothers, Saginaw, Michigan.

This unit is designed for rough and finish turning all crankshaft main line bearings and ends simultaneously; it incorporates three sets of cross slides which surround the crankshaft with cutting tools. Front and rear cross slides carry the rough turning tools and divide the tool load on the crankshaft during the cheeking, rough turning and filletting operation. A third massive slide which extends from spindle to spindle approaches the crankshaft from the top with finishing tools; these follow a few thousandths of an inch, behind the rough turning tools. When the rough turning tools have reached their diameter, they slowly withdraw while the finishing tools continue their spacing operation, and then proceed to finish turn and fillet the bearings.

The Model CF-4 Crankshaft Lathe is furnished with a hydraulically operated tailstock, live centers and an electric

power operated chuck controlled entirely by a push button on the control panel. The operator needs only to load the crankshaft and press a button on the control panel to start the machine in its automatic cycle.



The machine's production, naturally, depends upon the type of crankshaft and stock to be removed. On one leading automotive crankshaft, the production obtained from two of the older style crankshaft lathes with one operator was

USE ECONOMY — DERIVE ECONOMY



**SOCKET HEAD
CAP SCREWS**

**MILLED
FROM BAR**



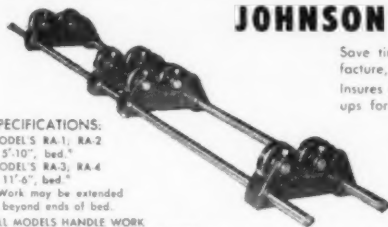
**HOLLOW
SET SCREWS**

**MADE OF
ALLOY STEEL**



ECONOMY MACHINE PROD. CO., 5207 Lawrence Ave., Chicago 30, Ill.

JOHNSON ROTARY WORK ALIGNER



SPECIFICATIONS:

MODEL RA-1; RA-2

5'10", bed."

MODEL RA-3; RA-4

11'6", bed."

*Work may be extended

beyond ends of bed.

ALL MODELS HANDLE WORK

MATERIAL FROM 1" TO 24" DIAMETER

LOAD CAPACITY: 1500 lbs. (All Models)

Save time and trouble handling materials requiring rotation in Manufacture, Assembly, Welding or Repair.

Insures perfect alignment of two or more units. Eliminates expensive set ups for miscellaneous jobs. Adapted to centered or uncentered work.

Checks alignment or run-out on any circular materials.

Tubing, shoting, etc. is easily rotated for uniform welding, joining, cutting, or welding fittings or flanges.

A precision tool of finest material and workmanship. Simple. Durable. Write today for complete description.

JOHNSON MACHINE WORKS

619 MENOMONIE STREET

EAU CLAIRE, WISCONSIN

TELEPHONE 8314

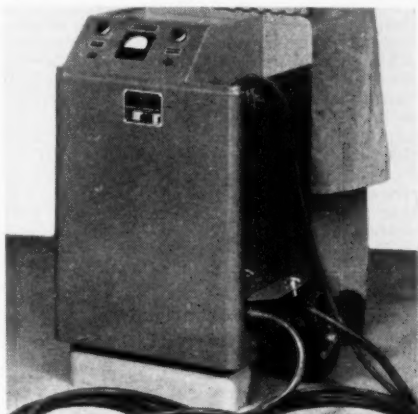
24 crankshafts per hour for rough turning only. Production of the same crankshaft on two new Wickes Model CF-4 Lathes with one operator is 35 crankshafts per hour for rough turning and all finish turning.

New Portable Magnaflux Unit

A new portable, and general purpose Magnaflux Unit is announced, which is expected to find wide application for maintenance and safety inspection, as well as in general inspection. With Magnaflux, all defects such as invisible fatigue cracks, shrink cracks, weld cracks, etc., are made readily visible by a magnetic particle indication built up on them by quick magnetization. The device is a product of the Magnaflux Corporation, 5900 Northwest Highway, Chicago 31, Ill.

The KH-05 Magnaflux Unit, illustrated, is developed to furnish the best on-the-job inspection. It requires only a 110-volt a.c. supply line to give either a.c. or d.c. magnetization with safety and flexibility, using low voltage and high amperage magnetizing currents; 500 magnetizing amperes are available. The a.c. magnetization is said to be best for location of all surface defects such as service fa-

tigue cracks in tools or shafts, and the a.c. furnishes a powerful demagnetizing field whenever needed. The half-wave rectified d.c. has been especially developed for location of sub-surface defects



such as internal cracks in welds, and for cracks on the inner surface of cylindrical parts.

HAND-QUICK

DRILL JIG

MIKRO-MARKER

MIKRO-VISE

AIR-QUICK

DRILL JIG

MIKRO TOOLS
by Metal Items
are precision
made and of
highest quality.

METAL ITEMS
820 SIXTH ST. • RACINE, WISCONSIN



**5/8" KNUCKLES. 19, 18 & 16 GA.
UP TO 3" OPEN WIDTH.
UP TO 8 FT. LENGTH
WITH OR WITHOUT HOLES.
SHIPPED LOOSE OR ASSEMBLED.**



DEPT. B

**S & S HINGE AND
METAL PRODUCTS CO.**

7125 IOWA
CHICAGO 51, ILLINOIS

Though portable, the KH-05 is built of heavy duty industrial components. The integral welded steel frame is supported directly on ball bearing semi-pneumatic rubber tired wheels. In the maintenance shop or wheeled out in the plant to equipment such as conveyors or punch presses, cranes and elevators, where shafts, hooks, or other parts may need to be inspected "on location", the KH-05 unit is ready to go immediately. An accessory compartment in the unit contains the powder and materials needed, and built-in storage is provided for the 30' of magnetizing cable supplied, as well as the line cord to reach the nearest 110 volt outlet.

At the job, the rubber covered flexible magnetizing cables can be quickly connected as desired, being equipped with Eitherend connectors throughout. A magnetizing coil can be quickly looped as needed, either around the part to be inspected or through openings in the part when that furnishes the best magnetization.

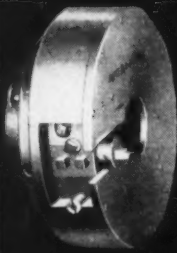
Three Eitherend connector outlets on the unit allow connection to two for a.c., or another combination of two for d.c. magnetizing current. All operation is con-

trolled by a single switch on an inclined control panel, which also carries a meter that reads in true magnetizing amperes, and a red indicator light to show when magnetizing current is available in the cable.

Using an accessory prod kit, magnetizing current is available at a pair of hand grip prods, to complete the full magnetization flexibility often required when complex castings, welds and other parts need current passed **through** them for best magnetization to find all defects.

The most sensitive magnetic particle inspection development is Magnaglo, which can be used with the KH-05 unit. With Magnaglo, the magnetic particles are fluorescent, and the indication built up at a defect glows as a brilliant green line when viewed with a portable black light, especially effective in threads and keyways.

Chaffee Design and Manufacturing Co., East Aurora, N. Y., designers and builders of special production and packaging machinery, announce the appointment of **Keller Industrial Products**, Rochester, N. Y., as their representative in the Western New York area.



IMPROVE FACING OPERATIONS

M-D Facing Head feeds automatically. Lathe tool bit travels radially, from center outward or reverse. 10 sizes 6" to 46" dia. Write for Bulletin, Prices.

On Boring
Mills,
Drills,
Lathes,
Millers and
Radials

MUMMERT-DIXON COMPANY, HANOVER, PA.

Actinium Available in Commercial Quantities

The first industrial production of the rare radioactive element, Actinium, an important development in the fields of radioactive research and application, has been announced. The achievement was made by Boris Pregel, scientist and engineer, and president of the International Rare Metals Refinery, Inc., 630 Fifth Avenue, New York City.

Actinium, the last of the natural radioactive elements to be isolated in commercial quantities, is about 150 times as active as radium, making it of the utmost value to nuclear physicists in the production of neutrons. Its other special properties also give promise of finding many vital uses in industry and medicine.

The success of Pregel and his technical staff in evolving a process for refining Actinium industrially culminates more than fifty years of scientific efforts all over the world to separate this element in sizable quantities since it was first discovered in 1898 by André Debierne, an associate of Madame Curie. Until now, Actinium was obtainable only in sub-microscopic amounts; its presence was determined through its characteristic ra-

diations and by spectrographic and microchemical methods.

Actinium (Ac—Atomic Weight 227, Atomic Number 89) is a decay product of Uranium 235, the natural isotope of Uranium 238, around which the entire atomic energy program was created. As a result of Pregel's work, it has now been isolated in a purified quality and will soon be available in commercial form.

Like radium, Actinium disintegrates spontaneously, giving rise to a whole series of other radioactive elements which attain a state of equilibrium with their parent, and it is the total of the Actinium elements which is used in the commercial applications. Actinium, by itself, is a nearly pure beta ray emitter; only 1% of its disintegrations yielding alpha particles. In equilibrium with its decay products, however, it also becomes a powerful source of alpha radiation.

Actinium in equilibrium emits strong beta rays, their energies ranging from 1 Mev to 1.5 Mev. These show considerable promise in therapeutic applications, particularly in the treatment of skin diseases, superficial tumors and other disorders near the surface of the tissue where penetrating radiation is not desirable.

• 50,000 PIECES PER GRIND



with WILLEY'S SOLID CARBIDE TWIST DRILL

On the typical valve guide bushing at the right, a Willey's Solid Carbide Twist Drill, in use for 50 days—produced approximately 50,000 pieces per grind. During this 50 day period, the wear on the drill was less than 1/16 inch.

Material, alloy cast iron.
1589 R.P.M.
Feed, .075.

Speed, 130 ft.
Automatic machine



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WILLEY'S CARBIDE TOOL CO.

SOLE MAKERS OF WILLEY'S METAL

1342 W. Vernor Highway

Detroit 1, Michigan

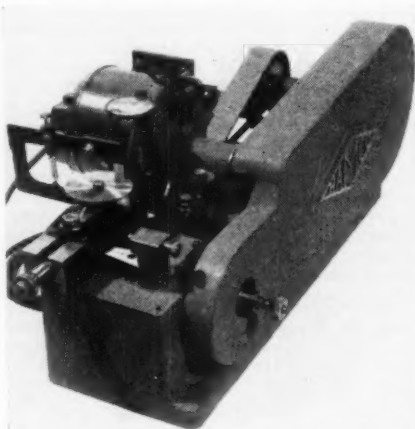
An abundance of soft gamma radiation is also present, Pregel pointed out, but, unlike radium, experiments indicate that this may be largely eliminated by a thin shield of glass or sheet plastic material. Since gamma rays are the harmful ones, Actinium is thus much safer than radium, forecasting its widespread use in luminous dials of the instrument panels of airplanes, tanks, ships etc.,

Actinium has a half-life of 13.5 years, which means it takes that long for half of a given amount of it to decay completely, and another 13.5 years for half of the remainder to decay. This given Actinium a distinct advantage over polonium as an alpha-ray emitter, since polonium, which Pregel's firm was also the first to manufacture commercially, has a half-life of only 138 days.

Boris Pregel has an international reputation as a scientist, engineer and industrialist, especially in the field of radioactivity. The Canadian Radium & Uranium Corporation, which he also heads, played a vital role in the development of atomic energy. During the war he was a consultant to the office of Chief of Staff of the U. S. Army. He is also vice-president and Professor of Physics of the *École Libre des Hautes Études*

Automatic High Speed Saw Sharpener

A compact, precision built, automatic saw sharpener has recently been intro-



duced by Hamberger Machine Co., 99 Mount Hope Ave., Rochester 20, N. Y. This ingenious machine is furnished com-

Save Set-Up Time WITH

NICHOLSON EXPANDING MANDRELS

Widely used for turning, milling and grinding, Nicholson expanding mandrels frequently demonstrate that operations can be completed in less time than was formerly consumed in looking for or turning a solid arbor. A set of 14 Nicholson mandrels replaces 209 solid arbors, for all bores $\frac{1}{2}$ " to 7". Two types; for square,

hexagonal broached, round holes. Sold singly or in sets. The standard in shops the nation over.



BULLETIN 1043 shows how to save time and promote precision with these widely used tools.

W. H. NICHOLSON & CO., 117 Oregon St., Wilkes-Barre, Pa.

Steam & Air Traps • Control Valves • Expan. Mandrels • Arbor Presses • Welded Floats

FOR REMOVING BROKEN TAPS ★

QUICKLY . . .

INEXPENSIVELY . .

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TAP EXTRACTORS are the TOOLS



**THE WALTON COMPANY
HARTFORD 10, CONNECTICUT**

plete with arbors for all size saws from $\frac{1}{4}$ " up to and including 12" diameter, and up to $\frac{1}{8}$ " across the face, as well as with friction clamps for large and small saws. The unit sharpens all teeth from 45 per inch to 2 per inch, inclusive.

The Hamco Saw Sharpener may be indexed either from the saw blade being sharpened or from a master saw. With master indexing, it is possible to sharpen saws time after time without losing the size, shape and spacing of the teeth, the manufacture state.

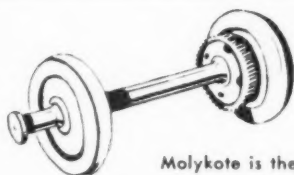
A graduated wheel dressing attachment, with two dressing diamonds included enables any type of wheel dressing to be accomplished in a few seconds. A 3-power magnifier allows close, precise adjustments to the smallest size teeth within the sharpener's range. Another useful feature of the Hamco is the graduated reset dial, set in .001" increments, which makes it possible to grind off only the required amount on any dull saw. A micrometer setting adjustment which conforms to the reset dial enables the finish grind to be taken off from the face of the teeth. A clutch disengages the grinding operation of the machine with a finger touch.

The stroke adjustment and lock of the Hamco unit are used to operate the machine manually in order to insure the exact cut and indexing on any number of teeth. Set-up time is also reduced to from one to three minutes.

The saw sharpener operates at speeds up to 145 strokes per minute. It is stated not to burn saw teeth, if operated properly. Saws up to 3" in diameter can be sharpened in less than 3 minutes, including the set-up time. Slitting, slotting and jewelers' saws up to 6 or 7 at one time can be sharpened if their combined thickness does not exceed $\frac{1}{8}$ ".

The Hamco saw sharpener occupies a floor space of 29" x 14"; the height is 47" overall; working height is 42". The weight of the unit is 150 lbs. The frame is of cast aluminum, and the machine is painted in gray crinkle finish.

The Butterfield Division of Union Twist Drill Co., Derby Line, Vt., manufacturers of metal cutting tools, has recently appointed the **Garner-Shelton Co.**, 20050 Livernois Ave., Detroit 21, Mich., a distributor in the Detroit area.



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FOR PRESS FITTING

and general "wear in" lubrication

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COMPAROSCOPE THE OPTICAL INSTRUMENT TO EVALUATE SURFACE FINISHES



The Comparoscope is a dual microscope equipped with a masterstage, that can be inter-changed with a 16 station master-turret. Inspection-stage and master-stage furnish identical magnification, under identical intensity of illumination. The split image observed in the eye-piece, permits therefore, a direct comparison of the surface obtained, against the master-finish. The operation of the Comparoscope is simplicity in itself, and gives the same quick indisputable answer to the production-worker as to the train specialist. The masters may be round or flat specimens, and their dimensions are limited only by the capacity of the master-clamp.



Specimens of any type up to $\frac{1}{4}$ " thick, can be mounted in the turret in a few minutes. Individual turrets can contain specimens of all important components for an entire product. A physical quality control system suitable for distribution to suppliers as well as for home office reference can be thereby established.

Effective quality control demands continuous surface-finish-inspection directly at the machine. The Comparoscope can be removed from its stand. Its compact design and light weight permit easy handling by the machine operators and floor inspectors. This feature has contributed greatly to the wide acceptance of the Comparoscope throughout industry.

COMPAR INSTRUMENT CO. 16179 HAMILTON AVE. DETROIT 3, MICH.

Fafnir Power Transmission

Designed primarily for light duty, slow speed anti-friction bearing applications, The Fafnir Bearing Company, New Britain, Conn. It is described as a simple arrangement of two pressed steel stampings to form a flanged housing enclosing a standard Fafnir self-aligning Wide Inner Ring type ball bearing. Light weight, factory sealed-in lubrication and ease of installation are listed as advantages of this complete ball bearing power transmission unit.

The Flangette is available for shafts of

18 sizes ranging from $\frac{1}{2}$ " to 2-3/16". While developed primarily for the agricultural implement field, it is expected to find uses in such lines as light duty conveyors, dryers, tumbling barrels, and many others, according to the manufacturer.

New Modernair Drill Press Feed

An easy-to-operate pneumatic drill press feed in two models has been added to the line of pneumatic and hydraulic industrial devices manufactured by Modernair Corp., 4222 Hollis St., Oakland 8, Calif.

The single acting power unit, installed on the spindle of a drill press, permits

CYLINDRICAL SUB-PRESSES

Dies for high precision work should not only be perfectly aligned but provision should be made to maintain that alignment throughout the life of the die. Our bulletin shows how it can be done.

WALTHAM MACHINE WORKS WALTHAM 54, MASS.



ARCH SUB-PRESS

controlled power operation. Due to a self-aligning feature, the annular piston moves inside a fully enclosed annular cylinder, so that the unit floats on the drill spindle directly over drill point.



Installation is made simply by removing the drill chuck and stop rod collar, and slipping the unit over the spindle.

Controls may be either for manual, semi-automatic, or automatic sequence, with simple three-way valve. Adjustable return spring action in all standard drill presses furnishes the power for the return stroke. Use of a foot pedal valve on the Drill Presses Feed frees both the operator's hands for loading or unloading.

A break-through cushion spring is furnished with the unit. Valve mount brackets are available on request, when the drill press specifications are furnished by the purchaser. Hand or foot operated BV or CRV 3-way valves may be mounted directly to the unit with a hose, if semi-automatic operation is unnecessary.

The Modernair Model No. 100 fits small bench presses up to 15" capacity; it develops 4 times line pressure, and accommodates up to 1-13/16" diameter spindles. The Model No. 200 fits 17" and 18" presses; it develops 9 times line pressure, and accommodates up to 2 1/2" diameter spindles.

Sigurd Landen has been made chief of the Carnegie-Illinois Steel Corporation's construction engineering bureau, this U. S. Steel subsidiary has announced; Edwin L. Tindall has been appointed chief operating engineer.

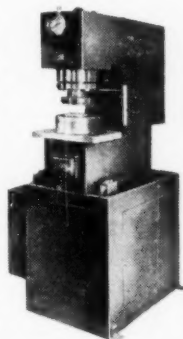
**PRODUCTION UP
1500%**

M & N SOLVES A PROBLEM ... Client Cuts Costs

The U. B. Company (name on request) was producing 30 buffing wheels an hour—using ordinary hydraulic equipment. Consultation with M & N engineers brought about plans and subsequent building of the M & N "C"—Frame press illustrated. HOURLY PRODUCTION JUMPED TO 450 UNITS!

M & N Hydraulic Presses are available from 5 to 75 ton capacity, compactly built and self-contained. Press may be operated manually, by foot, or push button. Double acting cylinder provides power ram return at high speed. This M & N "C"—Frame press features automatic reversal of pressure setting.

M & N Presses are successfully used for drawing, forming, powder metallurgy, silversmithing, punching, stamping, and a wide range of other industrial uses.



Write today for BULLETIN 102 A

M & N MACHINE TOOL WORKS, INC.
299 ALLWOOD ROAD CLIFTON, N. J.



CLOSED

TRADE

CLOSED
MARK

Plain Type

Offset Type

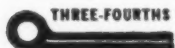
CONTINUOUS HINGES

All hinges shown can be furnished with special holes, cutouts and bends to blue-print in metals to suit the job.

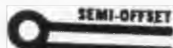
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& MFG. CO.**

**1110 E. 87TH ST.
CHICAGO 19, ILL.**

SPECIFICATIONS:
Open width $\frac{1}{8}$ " to 6"
Gage Material .040 to .125
Pin Diameter .101 to $\frac{3}{16}$
Lengths to 120"



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CHASERS

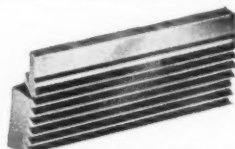
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**To Fit All Types
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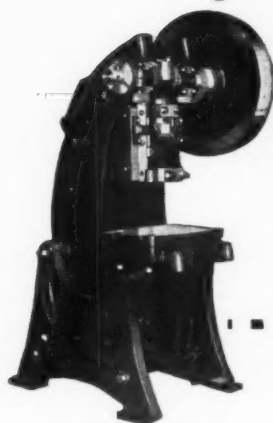
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for **LONG LIFE
DEPENDABILITY
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LITERATURE**

Marshalltown Presses incorporate many outstanding advantages and features of design. They are engineered and built to give you the most for your money. They include more die space—chrome molybdenum cranks, wrist pin connections.

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900 E. Nevada Street

MARSHALLTOWN

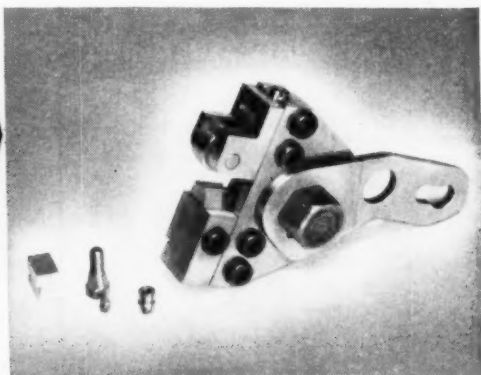
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REDUCED DOWN TIME

BETTER FINISHES

GET ALL "3"



WITH THE LITTLE SHAVER

The LITTLE SHAVER, designed for operation on Brown & Sharpe automatic screw machines, is adapted to standard tool holders in the same manner as a circular form tool. Sturdy, compact and simple in adjustment, the LITTLE SHAVER with standard or special formed tool and roll is the answer to your close tolerance problems all day long. And LITTLE SHAVER is inexpensive, too!

Send for complete information and prices. Consult us for special cutting tools of all kinds, including carbide.



AT LAST... A Low-Priced Straight Edge ... THAT stays straight



**R
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G
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Made of S.A.E. 1095
Steel . . . Hardened
and tempered to 40-45C
Rockwell . . . Edges
ground to .005" . . .
Thickness .093" . . .
Width 2 3/4" . . . Guar-
anteed to retain accu-
racy under normal shop
usage!

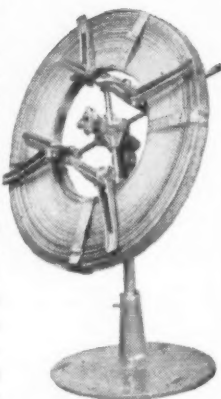
AVAILABLE IN 36"
... 48" ... 75" lengths
3 foot \$ 8.50 4 lbs.
4 foot 12.00 5 lbs.
75 inch 15.00 6 lbs.

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Distributorships in several choice territories still
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QUICK-LOADING STOCK REELS

The S and S stock
reels with quick load-
ing arms are de-
signed for the eco-
nomical handling of
stock from coils. Con-
structed with a snap
lock knuckle joint
for loading. These
reels may be set in
any plane from verti-
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Double swivel reels
are manufactured so
that loading is pos-
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is reeling out stock.



Dial And Roll Feeds For Presses

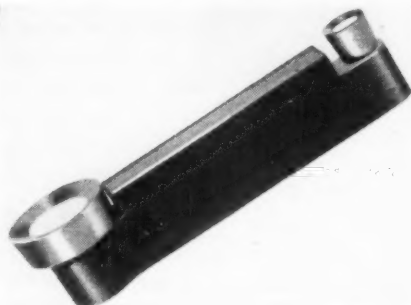


MACHINE WORKS
4539 W. Lake St., Chicago, Ill.

Radius Cutting Tool Has Wide Application

A new Radius Tool, has been designed for use on lathes, shapers, planers and screw machines in cutting a standard range of fillets, grooves, hubs, round corners or shoulders. In a majority of operations it eliminates individual hand grinding and checking of tools. The tool is a product of Forest City Bit & Tool Co., 1200 Kishwaukee St., Rockford, Ill.

A set of replaceable circular form tools for cutting full arc or partial radii from 3/32" up to 1/4" or 5/16" up to 3/4" is supplied with each tool holder.



These cutters are held in position by a hollow hex head screw against a flat seat on the shank of the cutter. All cutters are made of high speed steel, hardened and ground, designed to retain their original radius with repeated sharpenings throughout the life of the tool. The entire circular cutting edge may be used. The tool holder is furnished of heat treated alloy tool steel in two sizes: 1" x 1/2" x 5" and 1 1/4" x 5/8" x 5-7/16". The tools are furnished complete with tool holder, cutters, wrench and fitted box included.

Unico Floor Maintenance Machine

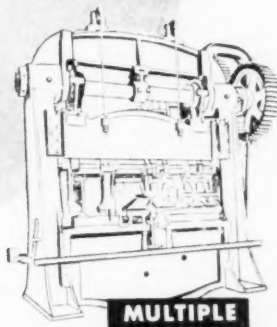
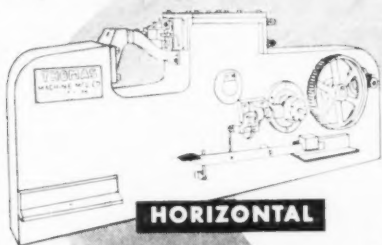
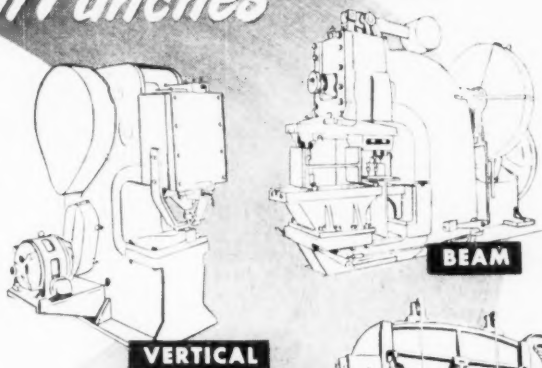
United Floor Machine Co., 7600 S. Greenwood Ave., Chicago 19, Ill., manufacturers of Unico floor maintenance machines, has recently developed a new floor machine known as Model 112-C.

The manufacturer describes the new model as an economy unit designed for floor maintenance in office buildings, factories, stores, show-rooms, etc., that do not require the larger, more expensive equipment. Company officials emphasize that the 112-C will do all the work of larger machines. It scrubs, waxes, polishes, sands and steel-wools all types of floors.

THE TREND IS TO THOMAS *in Punches*

Made in a wide range
of capacities to serve
your most varied
punching needs.

Send for bulletin on
type you require.



THOMAS
MACHINE MANUFACTURING COMPANY

PITTSBURGH (23), PA.

24

PUNCHES • SHEARS • PRESSES • BENDERS • SPACING TABLES

Equipped with a 12" diameter brush flare, the 112-C is said to have greater maneuverability, and will clean right up to the edges. Weighing only 68 lbs., yet sufficient to do effective cleaning, the entire machine can be carried with ease. Other features include a G.E. Motor unit with cushioned mounting for quiet operation; insulated dual safety switch can be operated with either hand; single tubu-

lar handle with 90° position adjustments equalizes weight distribution and improves balance; self-raising 3" rubber wheels; extra-heavy non-marking rubber bumper that is grooved to stay on during rough use; 35 ft. rubber extension cord. Accessories for scrubbing, waxing, etc., lock into position and are quickly interchangeable. The new model is available in chrome-plated finish.

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REAMERS IN *Decimal SIZES*

▼ 470 individual sizes carried in stock in variations of .001 from .032, .033, .034, .035, .036, etc., all the way up to .501; Any size required larger than .501... blanks can be ground to your exacting specifications, delivered in 3 or 4 days. By purchasing SUPEREAM Reamers in steps of .001 you SAVE time, labor and money in the cost of extra machining and lapping. SUPEREAM Reamers all have ground and polished flutes and are held within .0002 tolerance.

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Reamers are also furnished in Right-hand spiral, Right-hand cut, as well as Left-hand spiral, Right-hand cut. These specials are delivered in 3 to 4 days.

Write for descriptive literature and prices.



**TWENTIETH CENTURY
MANUFACTURING CO.**

3726 MONTROSE AVENUE

CHICAGO 18, ILLINOIS

Masticote Liquid Aluminum Roofing

By mixing aluminum powder and asbestos with a heavy-bodied black waterproof base, the Madison Paint Company has produced a fire-resistant, rust-proof roof coating called Masticote that is guaranteed to protect and waterproof old or new roofs for a period of ten years. This product requires no heating equipment, and may be easily applied by unskilled labor using either a brush or squeegee. It is distributed by Ohlgren Associates, 620 So. Waiola Ave., LaGrange, Ill.

The aluminum and asbestos in Masticote combine to reduce fire hazards from falling sparks and embers—an important factor in industrial areas. The aluminum also prevents the color bleeding of the previous roofing coat, a problem which is often encountered when re-coating old roofs.

Masticote actually acts as an insulating material when applied. The aluminum reflects summer heat to such an extent that some building interiors are from 20° to 30° cooler after the application of this roofing.

The new compound can be applied to wood, metal, concrete, gravel, paper, felt,

or previously coated roofs; 100 square feet of a good wood roof or composition shingles can be covered with 2½ gallons;

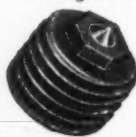


a smooth metal roof with 1½ gallons. Masticote is furnished in quantities as small as one gallon. Brush or squeegee applicators are furnished free with all orders over 35 gallons.



A REAL HELPING HAND

It's a help that die makers, tool makers, machinery builders and general machinists have long sought—a more accurate and surprisingly faster way of transferring blind screw holes.



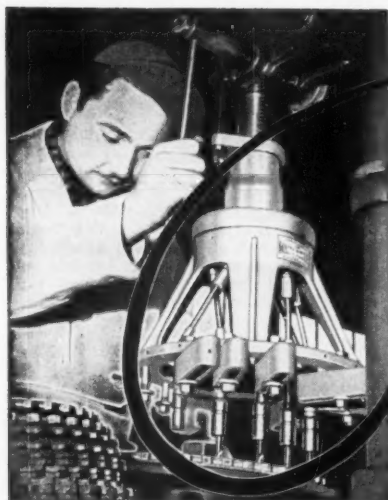
The Heimann Transfer Screw Set is a self-contained, complete tool. No wrenches or pliers are necessary. Made in $\frac{1}{8}$ " to 1" diameters. Send for price list.

HEIMANN MFG. CO.

332 Lincoln Ave.

Urbana, Ohio

MULTIPLE DRILLING with a . . .



MULTI-DRILL

**Increases Capacity
Up to 800%**

**ADJUSTABLE TO ANY HOLE PATTERN
FITS ANY DRILL PRESS**

If your production requires drilling from 2 to 8 holes in a work piece, a MULTI-DRILL will cut costs and speed output up to 800%. The MULTI-DRILL is universally adjustable to any hole pattern — is compactly built to permit easy, unhampered operation with drill jigs or other special fixtures. Ruggedly built to take the wear and tear of high production work, the MULTI-DRILL will handle your long and short run multiple drilling jobs with ease and economy. The MULTI-DRILL will drill on hole centers as close as $\frac{1}{8}$ " — handle drill sizes up to $\frac{3}{8}$ " in steel. Special adaptations available.

There is a Commander MULTI-DRILL Distributor in your area. Write for his name, literature and complete details.

COMMANDER MFG. CO.

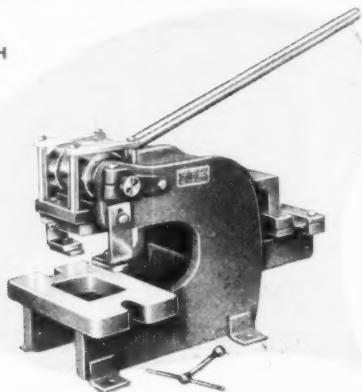
4227 West Kinzie St.

Chicago 24, Illinois

Product of *Commander* — Builder of the *Commander Tapper*

A BLANKING DEPARTMENT FOR \$120.00?

**LESLIE
MODEL A
HAND PUNCH
PRESS**



Tool your jobs at low cost from our wide variety of standard punches and dies.

Sounds Far Fetched? Well, consider these points:

- Capacity Up To 15 Tons
- Patented Leaf Provides Positive Punch and Die Alignment
- 6" Throat Depth
- Large Punch Plate and Bed Facilitate Blanking Over Big Areas.

The Leslie Model A Press is the solution to your short run blanking problems. Write now for illustrated catalog and circular showing punches and dies.

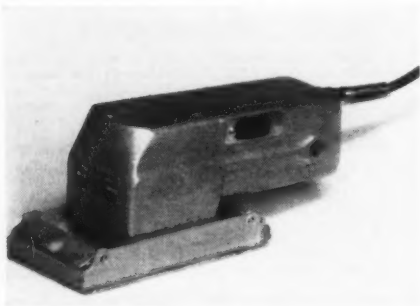
Diagram below illustrates versatility of this Press — each blanking done with one stroke.



LESLIE WELDING CO., 2941 Carroll Ave., Chicago 12, Ill.

Nedco Electric Reciprocating Sander

A new, electrically powered Reciprocating Sander designated as Model "R" has recently been introduced by Nedco Co., 88 Rumford Ave., Waltham 54, Mass. This tool is constructed with a balanced floating ball mechanism, and its straight-line action leaves no swirls, according to the manufacturer.



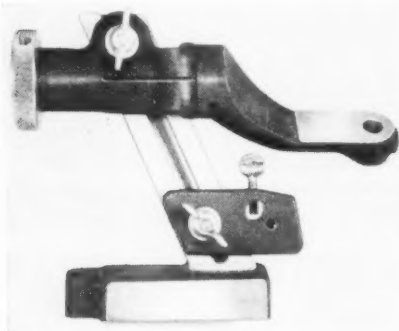
The Model "R" is stated to be smooth working, fast cutting and vibrationless. Its single-pad construction permits a back-and-forth motion—without sideways movement—producing a satin-like finish on wood, similar to hand sanding. The unit does perfect lapping, finishing and polishing, with no scratches across the grain, according to Nedco.

Standard equipment includes a 10-foot, 3-conductor cable with plug, a 3" x 7" molded rubber pad, flat type (special pads can be supplied on request). It operates on 110 or 220 volts, 60 cycles or less, a.c. or d.c. The weight of the tool is 7 lbs.

Three-Way Grinding Wheel Dresser

A new three-way grinding wheel dresser has recently been placed on the market by Detroit Industrial Products Co., 15244 Aubrey St., Detroit 23, Mich. This tool, known as the D-I-P dresser will do angle, radius, or straight wheel dressing.

One of the advantages claimed for this wheel dresser is that it saves time and operator fatigue by taking the diamond point to the wheel instead of raising or lowering the wheel to the dresser. A radius arm will dress either concave or convex radii. A second diamond holder is used for straight or angle dressing. All holes for diamond points are 7/16" i. d.



The dresser is available with either a magnetic or standard base. The magnetic base has a release lever for breaking magnetic attraction. The standard base is used for sliding the dresser to the wheel or along a gage when angle dressing. Either base is available with or without the radius arm.

Air-O-Check

THE VALVE WITH
THE INTERNAL
FULCRUM LEVER

AIR GUNS—THAT LAST AND LAST . . .

For blowing chips from work — For cleaning out hollow sets, machine recesses and tee slots — For drying parts before inspection and for many similar uses, Air-O-check is the Air-gun.

The internal fulcrum lever is a basic design in all Air-O-check Airguns, Sprayguns and Casing Valves. Write for details.

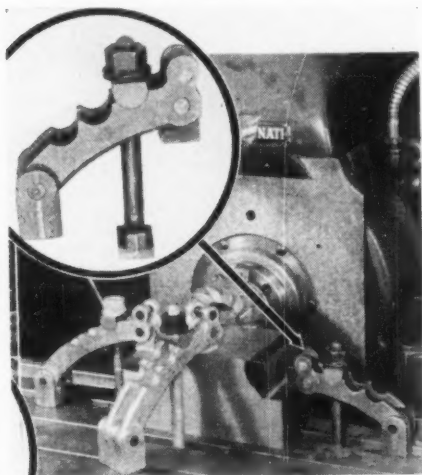


AIR-WAY PUMP & EQUIPMENT CO. 1054 N. KILBOURN AVE.
CHICAGO 51, ILLINOIS

C & S Universal Safety Clamps

A new series of four models of Universal Safety Clamps, designed to eliminate the use of blocks and shims in setting up jobs on a variety of tool room machines, has been introduced by Carroll & Shipley, 720 W. 12th St., Anderson, Ind. According to the manufacturer accurate surveys have indicated that the average tool room job requires from 40% to 60% set-up time. While a skilled tool maker is making his set-up, an expensive machine tool is idle. When C & S Universal Clamps are utilized, the set-up time does not exceed 10%, and the machine tool is in use almost around the clock, with relatively little down time.

The C & S Universal Clamps are insurance against any possible slippage, and clamp with a firm grip. They permit clamping on round bars held in V-blocks, clamping on narrow ledges, sloping surfaces and rough castings, as well as on



smooth surfaces. The Models 10 and 20 (with 6" or 8" bolts) for tool room use are shown in a set-up in the illustration above.

The clamps are made of heat-treated forgings. Each unit remains as a complete assembly, ready for instant use. By eliminating a precarious set-up on blocks and shims, they constitute a firm, safe set-up. Similar models are also available for holding dies, jigs, and fixtures on punch presses, drill presses, etc. All models can be furnished for bolts up to $\frac{1}{4}$ " diameter.

Compare for results! Compare for price!

and you'll choose the GREEN ENGRAVER



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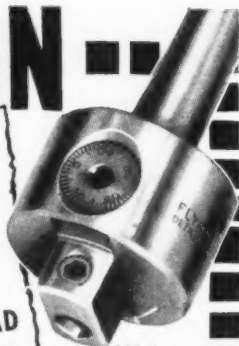
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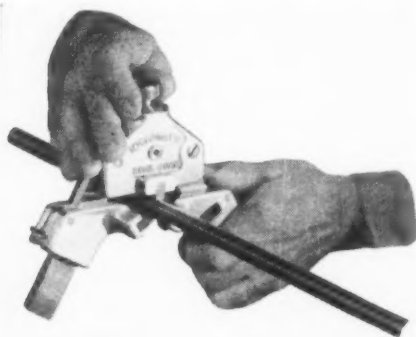
A model for practically every tool room and production operation.

FLYNN MANUFACTURING CO.
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Cylindrical Surface Honing Tool

Micromatic Hone Corporation, 8100 Schoolcraft Ave., Detroit 4, Mich., announces a new general purpose tool for honing external surfaces known as the Odee-Hone.*

No special machine or skill is required to produce accurate, highly finished surfaces on all types of cylindrical parts such as shafts, spindles, guide pins and bars, pistons and piston rods, valve spools and plug gages.

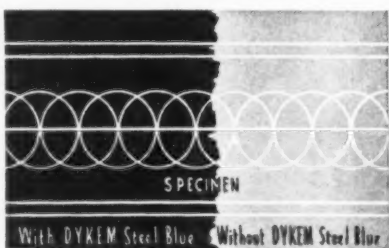


The Odee-Hone will hone any part from $\frac{1}{2}$ " to $2\frac{1}{2}$ " in diameter regardless of the length or material. It may be used with any lathe, drill press or electric drill. High tolerances can be held; diametric size is said to be easily held to .0001" or less, by means of a calibrated "feed" dial that gives absolute control of the in-feed of the abrasive. All out-of-roundness, waviness and chatter left by the previous machining operation is removed as a geometrically accurate cylinder is generated.

These tools are simple to set up and operate, and require no aligning, fixturing or wheel dressing.

The Odee-Hone is a sturdy unit built for long service. It is light enough to be easily carried and handled. The Odee-Hone is said to provide the advantages of centerless grinding without chatter or work-piece length limitation. The stock removal capabilities of this tool are stated to be in some cases comparable to those of a grinding operation. On long, small diameter parts, the capabilities of the grinding machine are surpassed because the abrading faces are self-reactive and do not tend to spring the work-piece.

* Reg. U. S. Patent Office



**DYKEM STEEL BLUE
STOPS LOSSES
making dies & templates**

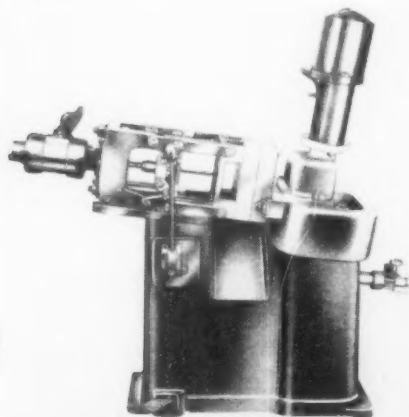
Simply brush on, right at the bench; ready for the layout in a few minutes. The dark blue background makes the scribed layout lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

Write for full information.

THE DYKEM COMPANY
2301 G North 11th St., St. Louis, Mo.

Automatic Die Casting Machine

A new air-operated die casting machine, Model A16A, with automatic injection of molten metal and automatic opening and closing is now available through DCMT Die Casting Machine Corp., 164 Duane St. New York 13, N.Y. This unit is designed to enable manufacturers to do their own die casting of small parts in their own shops. Manufacturers have saved as much as 400 to 500% on the cost of small die castings, which are proportionately more expensive than larger castings.



This machine features the DCMT fast chill and high cycling speed principles. In addition, manual ejection has been eliminated and the machine can now take jobs up to one pound in capacity, and utilizes die blocks up to 2½" in thickness and as large as 9" x 9".

Production speeds reach an average of 600 to 800 shots per hour. The die blocks supplied with the machine are prefabricated and contain everything except the actual cavities, which can be machined directly into these blocks. Single cavity molds are sufficient because of high cycling speed of the machine and mold cost is kept low. This new model features a heavy four-corner toggle lock which absorbs shot pressure and insures relatively flash free castings.

The manufacturer offers to interested firms a booklet on die casting, which describes ten features for producing better castings at high production speeds; it also contains a section on the fabrication of dies, the properties of zinc die cast alloys and shows pictures of parts die cast in major industries.

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C E Station, Bridgeport 5, Conn.



Clark
**ADJUSTABLE
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Vise-grip jaw runs full length of cutter channel, firmly and safely holds tool bits of all shapes, sizes and materials

Specifications		
Model	Size	Tool Capacity
60	0	1/8 to 5/16
61	1	3/16 to 3/8
62	2	1/4 to 1/2
64	4	5/16 to 5/8

With 15° or parallel cutter channel, left or right hand

ROBERT H. CLARK COMPANY
Beverly Hills, California
Manufacturers of Precision Cutting Tools

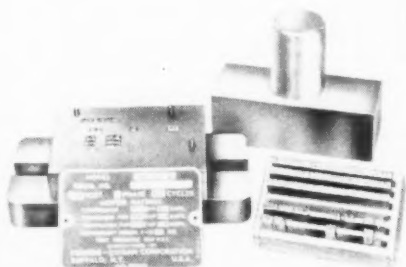
Name Plate Stamping Fixture

A special stamping fixture for marking metal name plates in mass production operations has been developed by the M. E. Cunningham Co., 149 E. Carson St., Pittsburgh 19, Pa. Designated as Model PSF-10, the fixture is designed for use in a small power press, screw press or kick press.

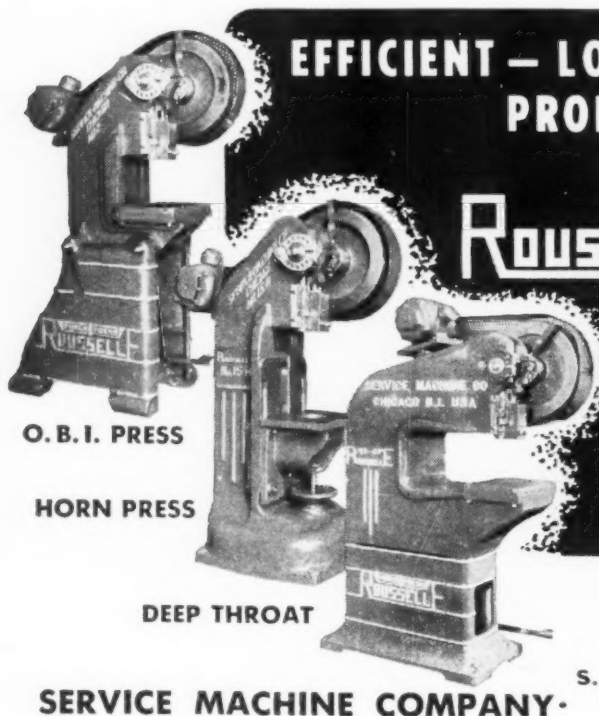
This marking device is composed of a chase block which contains the steel marking letters and a striking block which is held in the throat of the press by set screws. The striking block is made from heat-treated tool steel with the shank machined to required specifications.

Slots for containing the letters are machined out of the solid tool steel chase block to suit the set-up of the name plate layout. When the same style plate is used for several different models, logotypes are supplied. To assure alignment and even depth stamping, the logotypes are engraved to precision stand-

ards. They are easily changed by means of a small magnet or tweezers. The chase block is equipped with alignment pins so that the plate can be set quickly into



position over the type. It is mounted on the press bed by means of a holder section which can be clamped or bolted in position.



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ROUSSELL
PUNCH
PRESSES**

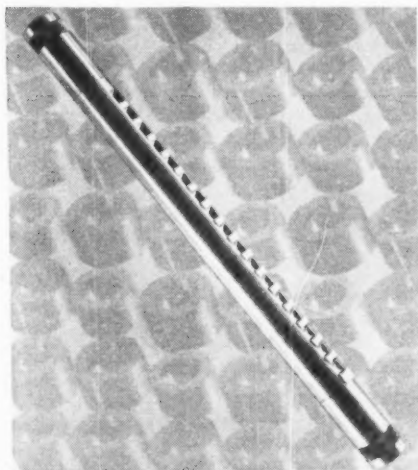
**WRITE FOR
DETAILS**

**7627-33
S. Ashland Ave.
Chicago 20**

SERVICE MACHINE COMPANY

Glenny Single-Pass Broach

The Kase Machine Company, 18428 Buffalo Ave., Cleveland 19, Ohio, has announced the redesign of the Glenny "SP" broach to incorporate a new cutting blade, featuring 12° rake angle teeth. Since teeth are sharpened on the front face only, blending ground face into chip contour, this new blade can be resharpened repeatedly during extensive production operations with no loss in cutting tolerance, it is stated by the manufacturers.



The 1" diameter "SP" broach illustrated was used on a production job to cut $\frac{1}{4}$ " x $\frac{1}{8}$ " deep keyways in mild steel in one pass. Five different interchangeable blades can be used with this particular size broach to cut a range of keyways.

"SP" broaches are available in diameters ranging from $\frac{1}{4}$ " to 2 $\frac{1}{2}$ ", in increments of $\frac{1}{32}$ ". While similar in appearance to the standard broaches in the Glenny line, these new units have a longer body and cutting blade to facilitate single-pass cuts.

Interchangeable blades are available for each size "SP" broach to permit cutting of different size keyways on a production basis. In addition, eccentric bushing-type adapters can be utilized with these new broaches for keyway cutting in bores larger than broach diameter.

Blades are interchanged quickly and easily by loosening end nuts, inserting the selected blade in the milled slot in the broach body, then hand-tightening the end nuts.

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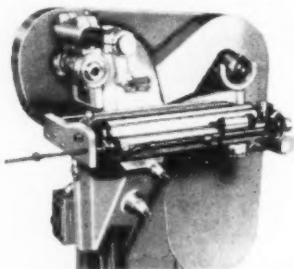
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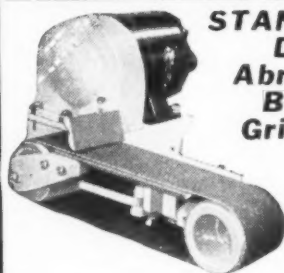


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The number **one** value in medium size all purpose milling machines. Hand or power feed. Send for information.

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STANDARD D-4 Abrasive Band Grinder

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This new streamlined bench type grinder assures fast, quality finishing on metals, plastics, wood, fibre . . . at low cost. Built to machine tool specifications, Standard D-4 is equipped with improved band tension control and specially designed protective motor hood 4x36 1/4" band. The ideal portable unit.

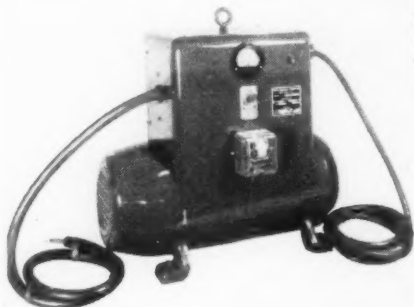
OTHER STYLES AND SIZES IN NEW
MANUAL ON FINISHING—WRITE TODAY

WALLS SALES CORP.

306 E. 38th St., New York 16, N. Y.

Industrial Truck Battery Charger

Motor Generator Corporation, Troy, Ohio, announces a new single circuit charger, Model 669-6-1, for charging a 6-cell lead-acid battery of up to 300 ampere-hour capacity, such as used in motorized hand lift trucks. The charger is built as an integral unit, is 100% automatic in operation and is designed to charge batteries (lead-acid) completely in eight hours or less.



To operate this charger, the operator inserts the plug connection to battery, and then moves the time clock switch (synchronous motor-driven interval time switch) to the "stop" (charge position) which automatically energizes the magnetic coil of the motor starting switch, starting the charge.

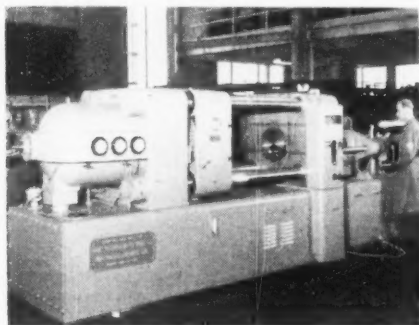
An Exide temperature-compensated voltage relay operates when the battery is about 80 to 90% recharged. At 77° F. and operating at 2.35 to 2.37 volts per cell, at the battery terminals, this relay closes applying a.c. to the time clock motor, which clock is set to its present time period—usually three hours. At the end of the present time period (when the clock reaches zero hours), it de-energizes the magnetic coil of the across-the-line motor starting switch, shutting down the set, also disconnecting the a.c. from the time clock and opening the battery charging circuit.

A 10-foot length of 3-conductor power cable with lugs and a 6-foot length of 2-conductor battery charging cable are furnished as standard equipment.

Harold Byron Smith, president of Illinois Tool Works, Chicago, has announced the opening of an Eastern Sales Office for the firm's Shakeproof Inc. division, at 405 Lexington Ave., New York; heading up the new office as Eastern sales manager is Russell W. Bill.

Hydraulic Die Casting Machine

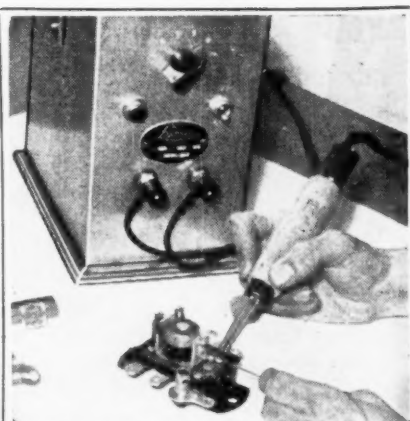
A recent die casting machine development of The Hydraulic Press Mfg. Co., Mount Gilead, Ohio, is the Model 400-M, a self-contained, all-hydraulic machine designed for producing castings in magnesium, aluminum, or base copper alloys. Castings relatively free of porosity are secured with this machine by means of high sustained injection pressure through the cold chamber injection system, and by confining these pressures within the die cavities. The injection plunger is returned hydraulically. The injection speed is governed through the control of the rate of discharge of the oil ahead of the injection piston.



The hydraulic die clamp for "live" positive die closing and sealing of the die halves, consists of a double action ram. The main ram is equipped with a fast closing booster ram which closes the clamp platen to within a fractional part of an inch of the total clamp stroke. Both die opening and closing are free of shock, adding materially to die life and reducing casting scrap loss to a minimum.

Die openings are controlled through electric timers. Automatic control of die movement, clamping, injection plunger movement is provided. A hydraulically actuated cylinder provides for the automatic ejection of the casting. Die clamping pressure is 400 tons. Production maximum is 125 shots per hour.

The Model 400-M Die Casting Machine is stated to give the manufacturer greater freedom in the design of his products, since die castings offer unusual flexibility in this direction. Die casting also reduces costly machining and finishing operations.



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The Luma resistance method of soldering is the accepted way for small shops requiring single operation to large plants with many types of operations. Write for complete information about this remarkable tool.

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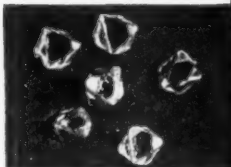
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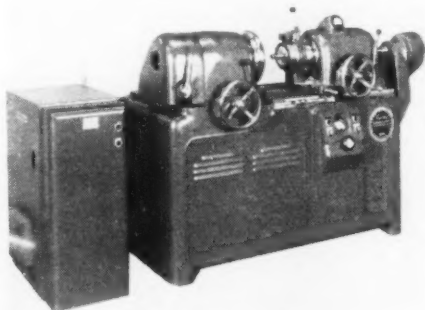
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Some Finish!
COLONIAL BUSHINGS INC.
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DETROIT 13, MICHIGAN

Development in Gear Sound Testing

The general trend to automatic transmissions and more rigid restrictions on allowable gear noise has broadened the practice of gear sound testing prior to assembly, as well as showing the need for greater precision in sound testing, a wider selection of test conditions, and more clearly defined testing standards.

As an answer to this need, a Red Ring Gear Sound Tester, Model GSQ, has been developed by National Broach and Machine Co., 5600 St. Jean Ave., Detroit 13, Mich. along more comprehensive lines.



Both operating heads now have their own d.c. motors, controlled through a single rheostat. These motors operate in the same direction of rotation and at any selected speed within the range found in gear operation under actual service conditions.

The gear set or sub-assembly under test may be driven by either head, while the opposite head is used as a brake or to stimulate gear loading under actual conditions. The amount of this loading is also variable, so that any condition encountered in actual service can be duplicated in the test—such as, for instance, power to input and brake output, power to output and brake input, running free, coasting, slowing down or stopping.

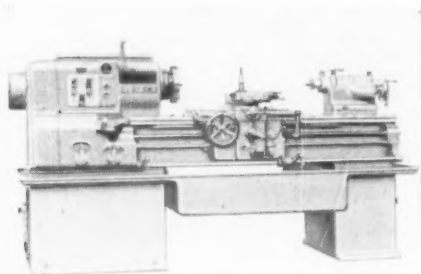
The amount of test load is indicated by an ampere meter and a tachometer registers the speed, so a record of gear performance may be made for any combination of load and speed.

This sound tester will accommodate either internal or external gears and is built in two sizes, one for gears up to 14" and a larger unit for gears up to 24" in diameter. Air clamping may be added to facilitate quick loading and unloading of the work gear sets.

LeBlond Heavy Duty Engine Lathes

More speeds and higher speeds are offered in the 1950 series heavy duty engine lathes made by The R. K. LeBlond Machine Tool Co., Cincinnati 8, Ohio. The line includes 12", 14" (illustrated) and 16" swing sizes with 24 spindle speeds, and a 20" size with 32 spindle speeds. A maximum of 1250 r.p.m. is attained in the 12" and 14" sizes.

These lathes are arranged for higher powered motors than previous models: the 12" and 14" sizes use a $7\frac{1}{2}$ h.p., 1800 r.p.m. motors; the 16", a 10 or 15 h.p. 1800 r.p.m. motor; and the 20" takes a 15 or 20 h.p., 1200 r.p.m. motor.



An enclosed quick change box, automatically lubricated, is included in the design. Sixty feed and thread changes are obtained through hardened alloy steel gears; shafts are supported on anti-friction bearings. The LeBlond compensating vee-way principle has been retained on the bed, which is fitted with replaceable hardened and ground steel bed ways, front and rear.

The patented LeBlond apron and tailstock have also been retained. The apron is of one-piece construction with positive jaw feed clutch and single lever length and cross feed control.

Condensed specifications of the 1950 series include:

	12"	14"	16"	20"
Swing over bed and carriage wings	14 $\frac{1}{2}$ "	16 $\frac{1}{2}$ "	20 $\frac{1}{2}$ "	22 $\frac{1}{2}$ "
Spindle Speeds	24	24	24	32
Spindle speeds, range	25-1250	25-1250	16-1010	9-800
Motor recommended	7 $\frac{1}{2}$ * 1800	7 $\frac{1}{2}$ * 1800	10-15* 1800	15-20* 1200

* Denotes h.p.

† Denotes r.p.m.

The LeBlond line of heavy duty engine lathes also includes four larger sizes—25", 32", 40" and 50"—conforming to the same basic design.

REDUCE WASTE IMPROVE WORK SAVE TIME

WITH

MILFORD

Profile Saw Blades

MILFORD Profile Saw has long been accepted by tool and die makers as a basic tool for internal or external contour sawing. Originated by MILFORD, this narrow blade for contour cutting has milled, precision-set teeth — follows a straight or curved line fast and accurately. Your MILFORD Distributor can serve you from stock.

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Increase your production as much as 50% with the Midget combination drill and countersinks, available in 60°-82°-90° angles to fit drills up to 1" in diameter. 48 hour service for regrinding all types of Carbide and High Speed steel rotary files and Countersinks.

Bulletin No. 50 upon request.

MIDGET TOOL & FILE CO.
P. O. BOX 1087 SAGINAW, MICHIGAN

NIELSEN Heavy Duty

Live Centers

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live centers

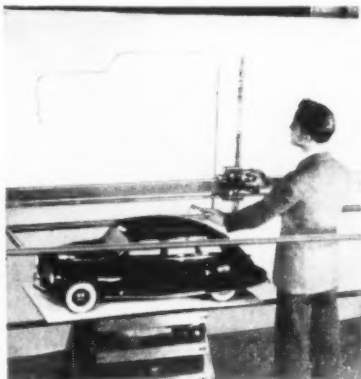
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for heavy
duty work.
Precision type
ball and roller
bearings assure
maximum capac-
ity for high speed
production and long
service.

NIELSEN, INC. LAWTON, MICH.



Contour Duplicating Device

A device which makes it possible to reproduce on paper the exact contour of irregular surfaces in a fraction of the time required by the method of cutting and fitting wood templates has recently been introduced by Inter-Lakes Engineering Co., 4845 Bellevue Ave., Detroit 7, Mich.



The ingenious instrument, called the "Dupligrath", transfers on transparent paper the exact contour of a plastic or clay model, such as the automobile model here illustrated.

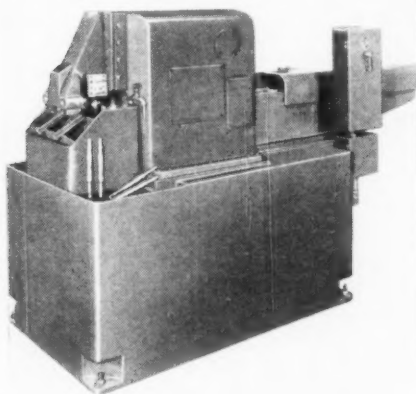
The use of the Dupligrath is particularly advantageous for securing concave readings in forming dies which frequently cannot be checked with ordinary templates. It also solves the problem of securing a true reading of a stamping, die-casting, etc., showing the amount of spring-back and warp.

In the manufacture of products which require the close following of models, the Dupligrath replaces an inspector's time, since it gives cross-section lines relative to each other. This is usually done on vellum and checked against the draft or layout. The result is a full contour line as compared with only a spot dimensional check by the former method. The "Dupligrath" is made in a number of sizes, including a model for small tool shops.

Ampco Metal, Inc., Milwaukee, Wis., has announced that the Jaeger Welding Supply, Inc., Springfield, Mass., and the Texas Welding Supply Co., Dallas, Texas, have been appointed as franchised distributors in their respective areas handling the complete line of Ampco electrodes.

M & M Introduces Automatic Forming Machine

Forming operations of external grooves and shapes as well as various end opera-



tions can be performed on tubular or solid stock by the new Automatic Machine manufactured by The Mott &

Merryweather Machinery Co., 715 Penton Bldg., Cleveland 13, Ohio. Single or double, hollow, collet type spindles are available and banks of double spindle machines can be formed as production requirements dictate.

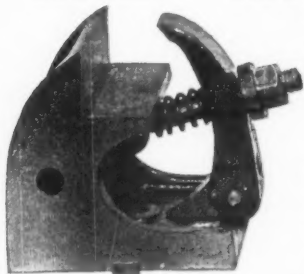
The heavy duty tool slides carry the form and end-operation tools, advancing and retracting automatically by positive cam operation. When arranged as an automatic bar feed machine, a magazine stock loader can be provided. Hopper loading from the front or rear can also be furnished to meet specific needs.

The entire cycle of this double spindle machine is actuated mechanically by a single cam shaft. The geared drive of the cam shaft contained in the base has pick-off gears so that the cycle time can be changed to reach ultimate production with good tool life. The spindles are driven by individual V-belt motor drives housed in a separate compartment in the machine base. The welded steel base also contains the coolant pump and large chip compartment with access doors for easy chip removal.

HART MILLING FIXTURES

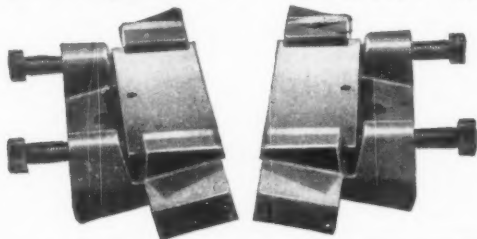
"MASTERS OF 1000 SET-UPS"

Eliminate many needs for Special, Expensive Jigs and Fixtures



These fixtures make themselves popular and profitable in any shop—are used in either horizontal or vertical position. Suitable to hold round hexagonal, octagonal, or square stock, aligning the work with the machine. Grip holds the work on the bottom as well as on the back. Generally sold in pairs. Made in 4 sizes—to hold stock from 1/2 to 5 inches.

HART MACHINE VISE JAWS

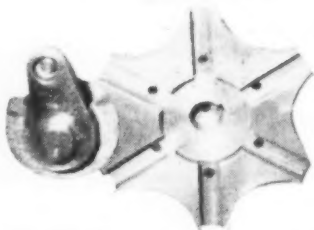


These Jaws are very useful on any machine table. They clamp or bolt to the table, the angles firmly holding the work down. Each hardened tool steel jaw measures 3"x6"x1/2". The angle edges are serrated.

We also manufacture Hart Index Centers.
Write for Bulletin No. 49

HART MACHINE CO.
26 Mather St. Dorchester 24, Mass.

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USE A GENEVA!**



4-5-6-8 POINTS 48 SIZES
3" to 5 3/4" CENTER DISTANCE

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402 ELLAMAE AVE.
TAMPA, FLORIDA

Flame Failure Oil Burner Safeguard

Light-oil burner installations with a capacity in excess of 5 gallons per hour in institutions and commercial establishments require control equipment that provides the maximum safety against the possibility of explosion. These installations are equipped with control and safety equipment which permits an unsupervised start-up period of between 45 and 90 seconds. Pressure atomizing gun type burners light up within 2 seconds after power has been supervised for more complete safety.

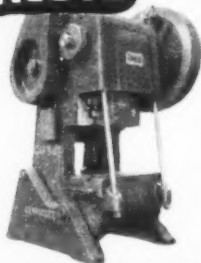


The Fireye System FF-1 has been introduced to provide complete flame failure protection for commercial gun type light-oil burners. In the event of light-off failure, lock-out will occur 5 seconds after power has been applied to the burner motor and electric ignition. This feature is essential in protection against the hazard of pumping atomized oil into a hot fire box, should faulty electrodes cause failure of electric ignition. Furthermore, if flame failure occurs during an operating cycle, safety lock-out will occur within 2 to 4 seconds, as compared with a delay of as much as 2 minutes with conventional safety controls. The device is a product of Combustion Control Corporation, 77 Broadway, Cambridge 42, Mass.

The Fireye System FF-1 consists of Photoelectric Scanner Type 45PH5 and Programming Control Type 24PJ8. All equipment is approved by Underwriters' Laboratories, Inc. and Factory Mutual Laboratories.

Specifications include a supply voltage of 115/200/230 volts, frequency of 50/60 cycles. The rated supply voltage for a 1 h.p. burner motor is 115/230 volts, 60 cycles; pilot duty 125 va., ignition 250 va. The ambient operating temperature covers the range of 32°-125° F.

FERRACUTE



**NEW DESIGN
OPEN-BACK**

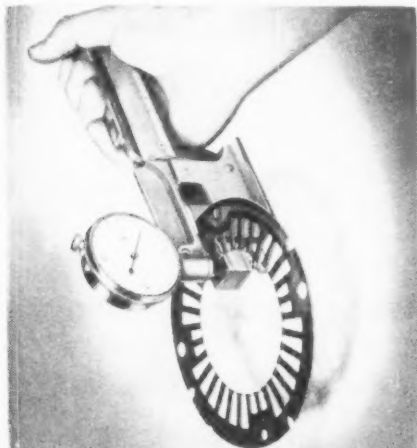
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32 to 150
tons PRESSES**

*Send for new broadside giving
complete description.*

FERRACUTE MACHINE CO. Bridgeton, N.J.

Ames Burr Gauge for Stamping

The B. C. Ames Co., Waltham, Mass., announces a new gauge designated as the S-4930 Burr Gauge, which is designed to measure accurately the height of burrs in stampings of all materials. As dies and punches wear, a burr is thrown up on the punch side of the stamping, and in many instances this burr causes difficulty in assembly of parts, especially where used as serrations or when they are stacked up in assembling units. It is said to be particularly useful in controlling punch and die life. It takes the guess work out of the determination of the frequencies of grinding dies and punches.



With the Ames Burr Gauge, the press operator, the inspector, and the die maker, all get the same readings on the same stampings, making for mutual agreement as to grinding time.

No definite set of standards regarding burr height has been set up. Each individual shop, on its own product will be able, however, to work out a definite set of tolerances to meet its particular requirements. By using this Burr Gauge, impartial data can be obtained to set up the standards.

In operation, the Gauge is generally held vertically by means of the knurled handle, and the lever is squeezed, which closes the two clamping surfaces which are rounded chisel in shape. The specimen then hangs in the Gauge in a vertical position and the actual amount of burr shows on the dial in direct readings in one half thousandths of an inch;

quarter thousandths can be easily estimated.

The lower chisel contact is supported by parallel reeds to insure parallel motion of the chisel surfaces, regardless of thickness of the specimen. When the specimen is clamped between the chisels, the upper chisel crushes through the burr until the upper chisel bears against the flat of the specimen, but does not bed into the specimen, as the cushion spring on the lever between the lower chisel and lever acts. The indicator contact then rests on the burr and actual height of burr is shown on dial.

Bristol Adds to Socket Screw Line

The Bristol Company, Mill Supply Division, Waterbury 20, Conn., announces the addition of smaller size socket set screws and cap screws to its line of multiple-spline socket screw products. These are specially designed for use in small assemblies for equipment such as cameras, scientific instruments, electronic equipment, computing machines, etc. The new multiple-spline socket screws are made as small as No. 2 wire size, and the cap screws are made in diameters to No. 0 wire size. Bulletin 879 gives full specifications.

**A REALLY VERSATILE
ROLL FEED \$129.50**



Quality built for long, dependable service. Models available to fit all size power presses.

Write today for circular and prices.

ROLL FEEDS CORP.
PAWTUCKET • RHODE ISLAND

DoAll Cylindrical Grinding Attachment for Surface Grinders

The DoAll Company, 254 N. Laurel Ave., Des Plaines, Ill., announces a new Cylindrical Grinding and Indexing Attachment, designed to make a surface grinder a more versatile machine. Work is held either in collets or on centers, capacity being 6½" swing and 7½" between centers. The spindle is driven by a built-in motor, through step pulleys giving speeds of 200, 400 and 700 r.p.m.

A two-way sine-bar tilt arrangement makes it possible to grind tapers up to 45°, either forward or rear, and because of the sine bar's inherent accuracy, tapers can be exactly duplicated.

The attachment is also equipped with a 24-division index plate, for the rapid and accurate grinding of square or angular punches, or work of similar nature. Index plates having a greater number of divisions are also available.

The unit can be quickly mounted or removed from the surface grinder, since it is held in position only by the magnetic chuck. Long shafts up to 1½" in diameter will pass through the spindle hole, being held in No. 3C collets. Step

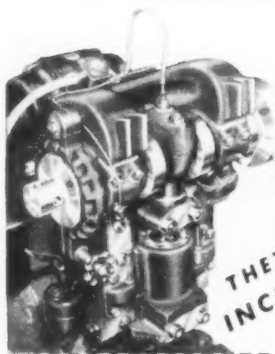
collets and blanks are available for larger sizes, up to 3". The spindle is mounted on Timken precision bearings, and the speed reducer has a hardened worm and fiber worm gear. Also included is an adjustable indicator bar.



Among the available attachments are face plates, male and female centers, a diamond holder, steady rest for small work, collets, and a rapid-action lever collet closer.

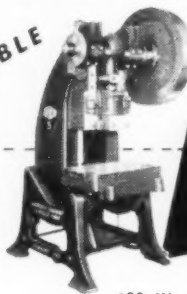
IF YOU FAVOR

**RUGGED
EQUIPMENT,**



THEY'RE
INCLINABLE

**JOHNSON POWER
PRESSES ARE THE BUY!**



Because Johnsons are built extra husky, you can do bigger jobs on smaller presses. Why not pay yourself a production bonus the Johnson way?

Johnson

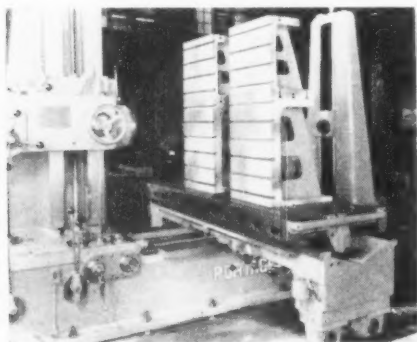
**MACHINE
and PRESS CORP.**

620 W INDIANA AVE • ELKHART, IND

ALL JOHNSON MODELS from 16 to 90 ton capacity have EXTRA SAFETY FEATURES you should know about. Write for FREE CATALOG of six Inclinales now available. You'll be happier with Johnsons on the job!

Angle Plate for Precision Machinery

A new precision-type angle plate is being manufactured by The Portage Machine Co., Akron Ohio, for use on horizontal boring machines, planers, milling machines and radial drill presses where accuracy in the machined part is of primary importance.



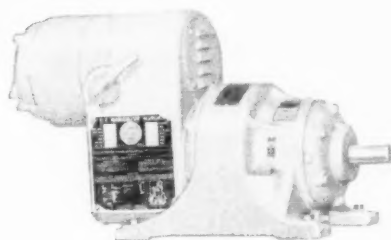
These angle plates are constructed of close grained cast iron, rough machined, normalized for stress relief to prevent warping, then finish-machined on all faces and edges. The design is extremely sturdy, with heavy rear reinforcing ribs and a thickness of metal under the T-slots equal to that of the face, to insure rigidity.

These angle plates are made in two sizes—6 slot and 4 slot high. The base of the 4 slot plate is the same size as the top of the 6 slot plate and when bolted to it, provides additional height equivalent to a 10 slot plate. All slots are machined to take American Standard $\frac{3}{4}$ " T-bolts.

Combination Geared Variable Speed Motor

For users of fractional horsepower motors, a new design has been developed by U. S. Electrical Motors, Inc., 200 E. Slauson Ave., Los Angeles 54, Calif. It combines in one unit a Varidrive which permits instant change of speed in a ratio of 1 to 10 and a heavy duty Syn-cro-gear for increasing the torque. The unit is designated as Type VA-GD and is available in $\frac{1}{4}$, $\frac{1}{3}$, $\frac{1}{2}$ and $\frac{3}{4}$ h.p. Speed ranges are from 10 to 10,000 r.p.m.

The motor was designed for those fields of operation, where a light weight industrial motor is required. The frame of the Varidrive is cast aluminum. A new type of dial control permits instant speed changes by turning the handle less than one revolution to obtain any speed change. Slippage is prevented by incorporation of an Autotaut belt tensioner which automatically compensates for



various loads. The gears of the Syn-cro-gear unit are specially designed and have a hardness of 45/50 Rockwell C. Quick inspection of the interior is made by loosening four screws and removing the cover plate.

CUT YOUR MICRO-DRILLING COSTS

with precision ground and lapped MICRO-DRILL full-length GUIDES.

For No. 80 to 3/32" drills 3/32" to 3/16" body sizes.

We will also micro-drill your parts.


MICRO DRILL GUIDE
AND
ENGINEERING COMPANY • DETROIT 28, MICH.
18515 WEAVER VE 7-8751

Adjustable Spindle Stand for Finishing and Polishing

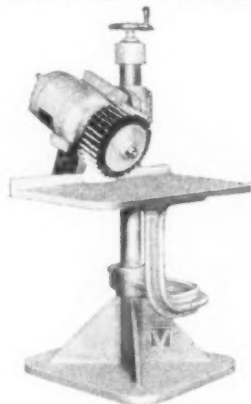
The Vonnegut Moulder Corporation, 1805 Madison Ave., Indianapolis, Ind., announces development of a new "universally adjustable" spindle stand. Designed for finishing and polishing work which is to be pushed across a table by hand or by power feed, the stand's motor can be turned to point the spindle straight up, straight down and through all of the 180° between these extremes. The unit has 20" of vertical adjustment and also 5" adjustment lengthwise of the spindle. With this three-way combination of adjustments, a head can be brought into proper relation with any surface of any pattern when the spindle stand is located next to a feed bed or table on which the work pieces are being advanced.

In addition to these three adjustments, the motor and its support may be rotated around the vertical column. On narrow patterns or edgework, the full 4" width of abrasive can be used by resetting the head with the 5" longitudinal adjustment.

The laminated wood table adds to the versatility of the machine. Guide pegs or an additional fence, to channel the

stock between two fences, can be easily attached or removed.

When used with power feeding mechanism, the standard table and its sup-



porting arm are omitted, allowing free rotation of the motor and its support about the vertical column. Flexible arrangement of multiple stands is thus permitted.

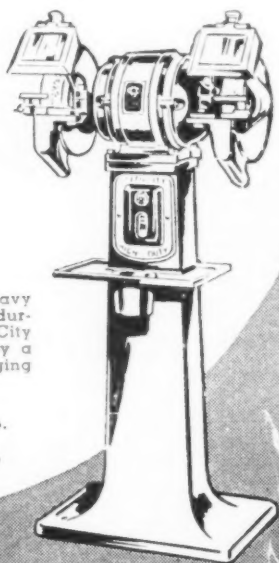


Cut grinding costs . . . with rugged **QUEEN CITY Grinders**

Queen City Grinders are built to stand up under the heavy work that pours through the shop daily. Noted for their durability, freedom from downtime and low cost, Queen City Grinders cut grinding costs to the bone. • Order today a battery of these low cost grinders and eliminate "ganging up" around one lone grinder.



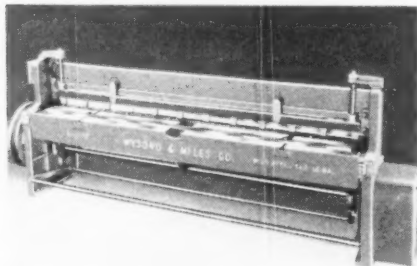
QUEEN CITY
Machine Tool Co.
235 E. 2nd St.
Cincinnati 2, Ohio



Wysong and Miles 16-Gauge Power Squaring Shears

Wysong and Miles Co., Greensboro, N. C., has introduced a new line of 16-gauge power squaring shears in cutting lengths of 42", 52", 72", 96" and 120".

Bed, end-frames, knife-bar, holddown and top girder are one-piece hi-tensile castings containing more than 30% steel.



To insure accurate cutting, the bed is squared with the end-frames in all three directions. Ways for holddown and knife-bar travel are accurately machined from steel and hand scraped for perfect bearing so that travel is true and neither can rock nor deflect.

The clutch is of the sliding key type with spring loaded finger to prevent clicking. A non-repeat unit is built into the clutch. It can be set for single stroke or continuous shearing.

The back gauge is of ball-bearing precision type, adjustable to .0078" (1/128 inches) by turning a handwheel. To aid in positioning sheets and to provide an accurate measure from the cutting edge, adjustable stainless steel cables are embedded in the table. Holddown action is automatic with pressure governed by large adjustable compression springs.

Other standard equipment includes multiple-edge blades, two front gauge brackets with front gauge, side and bevel gauges, motor and controls. A plexi-glass finger guard and a side extension squaring arm, for either right or left hand side of shear, can be furnished as extra equipment.

James A. Cowan has been transferred to Pittsburgh, as direct factory representative for Macwhyte Company, wire rope manufacturers, of Kenosha, Wis.; his headquarters will be in the Rea Bldg., 704 Second Avenue.



SAVE **5** WAYS

with the NEW

HAPCO

**AIR POWERED
HYDRAULIC
PRESS**

Bench model—floor stand optional at extra cost.

Write for new bulletin.



HAPCO

HY-AIR PRODUCTS COMPANY

1703 Probert Rd., Jackson, Mich.

1. LOW FIRST COST

Simple design lowers price below comparable equipment.

2. NO INSTALLATION COST

HAPCO hooks up instantly to shop air line — sets on bench or stand. No costly installation.

3. SIMPLE OPERATION

Pressure easily regulated — ram stroke quickly adjusted — powered return stroke — built in safety. Foot, hand or solenoid controls.

4. MINIMUM MAINTENANCE

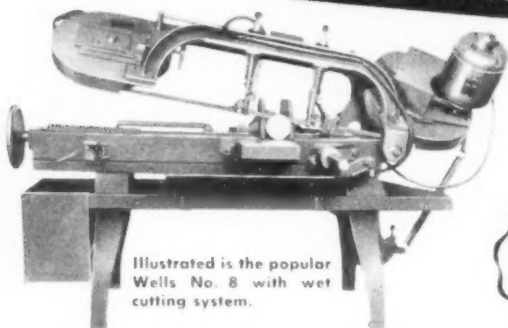
Only two moving parts. All working surfaces hard chrome plated. All power development accomplished by air and oil.

5. INCREASED PRODUCTION

An automatic Rotary Feed Table is available, providing you with increased production.

On cut-off jobs...
You benefit
4 ways with
Wells Saws

1. Fast, continuous cutting action.
2. Greater accuracy on each job.
3. More pieces per length of stock.
4. Greater overall economy.



Illustrated is the popular Wells No. 8 with wet cutting system.

*Our
25th
Year
of Service*

HORIZONTAL band sawing is the modern, cost-cutting way to handle cut-off jobs . . . and Wells Saws are the leaders among horizontal metal cutting band saw machines. Simplicity of design means fewer moving parts and easy operation. Ruggedly built to increase productivity and reduce cutting costs, a Wells Saw pays for itself quickly and will give you years and years of dependable, satisfactory service.



Products by Wells are Practical

METAL CUTTING BAND SAWS

WELLS MANUFACTURING CORPORATION
 707 COOLIDGE AVE., THREE RIVERS, MICH.

Attachment for Step-Drilling Plastic Parts

This machine for drilling plastic parts employs two Drilling Units equipped with a Step-Drilling Attachment. Both the drilling unit and the attachment are manufactured by Black Drill Co., 1400 East 222nd St., Cleveland 17, Ohio.

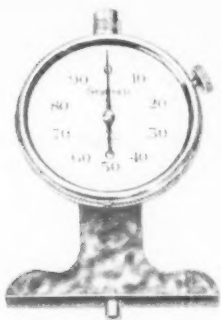
The Step Drilling Attachment permits the drills to advance partially into the work, withdraw, advance farther into the work, again withdraw, then complete the drilling to the required depth before ending the cycle. This avoids overheating the plastic, and is said to speed up production without as much danger of rejects.



The Step Drilling Attachment is stated to be useful also for deep drilling of steel, cast iron, non-ferrous and other materials and can be made with practically any number of steps over a given stroke length.

New Starrett Dial Depth Gage

The No. 644 Dial Depth Gage, introduced by The L. S. Starrett Co., Athol, Mass., is designed for measuring the



depth of holes, slots and recesses ranging from 0 to 3" deep. To use this gage, the flat base is positioned on the top surface of the work, allowing the rod to

enter the hole or recess to its full depth. The measurement automatically registers directly on the dial in increments of .001".

The base, 2½" long by ½" wide, is hardened, ground and lapped within close limits. The dial indicator, attached to the base by a flush type hollow set screw, readily removable by means of a wrench furnished with the gage, is interchangeable with any other standard A.G.D. indicator.

The standard dial indicator is the Starrett No. 25-F, which is adjustable relative to zero, graduated .001", dial reading 0-100, range .250". Other dial arrangements are also available. The gage comes equipped with a ¼" long rod approximately 13/64" in diameter and in addition, eleven other rods ranging in length from ½" to 3" in increments of ¼" are also provided. The gage is furnished in a leather case which also holds the 11 rods and permits quick selection of the correct rod for every job.

William P. Gillespie, manager of the Market Requirements Department of Henry Disston & Sons, Inc., Philadelphia, has been named manager of chain saw sales for the firm.

It could only happen in Cincinnati.....

MACHINE tool center of the world, Cincinnati boasts that its citizens are providing worthwhile solutions to many machining problems. The U. S. Drill Head Company's engineers have for many years been leaders in their field, manufacturing all types of multiple spindle, fixed center, adjustable and lead screw tapping heads.

The photograph at the right, is a U. S. Drill Head adjustable head, available in 36 sizes and 5 types. It is mounted on a tapping unit for a machine that does not have a reversing spindle.

U. S. Drill Head can equip the spindles with single purpose tap chucks, floating tap holders, or safety tap holders, which prevent tap breakage and permit the hole to be tapped to the bottom without any breakage.

By locking the tapping unit the complete setup can be used for drilling also. Compactly designed, this heavy-duty tool is adaptable to any drilling machine, round quill, or flange type spindle.

• Write for New 1950 Catalog.

**IMMEDIATE
DELIVERY!**

UNITED STATES DRILL HEAD CO. Dept. 1 • 616 618 Burns Street, Cincinnati 4, Ohio

SINCE 1915

THE MARKET PLACE

FOR EMPLOYMENT AND SALES SERVICES

Advertisements acceptable in "THE MARKET PLACE" include those for employment, sales services, representation and related needs. If desired, replies can be sent to the BLUE BOOK and we in turn will forward to advertisers.

Rate: \$12.00 Per Column Inch Per Insertion . . . Maximum Space Per Advertisement: 2 Inches.

GISHOLT BALANCER

Serial No. 6X2620, practically new and in operation only short time, priced to sell.

WRITE DORMAN PRODUCTS, INC.

1004 Sycamore St.

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ENGINEERS — EXECUTIVES MANAGERS — TECHNICAL MEN

Salaried Positions—\$3600 to \$30,000. This confidential service for men who desire a new connection will develop and conduct preliminary negotiations without risk to present position. Send name and address for details.

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1208-1 Berger Bldg. Pittsburgh 19, Pa.

THREE NEW FEATURES OF THE BLUE BOOK

1. The Market Place. If you want to obtain distributors, additional lines, sales representation, or if you want a new job, or hire technical help, the Market Place is your answer.
2. Reader's Service. Want to know who makes it? Who sells it in your locality? Interested in a certain kind of machine, tool, or attachment? Reader's Service will give you the answers. Use the handy cards in each issue.
3. Machine Tool Directory. A new feature of each issue of the Blue Book is the directory which lists the models, sizes, and major specifications of machine tools built in America. This issue features Bench-type and Hand-type Milling Machines, and concludes Knee-types, begun in the July issue.

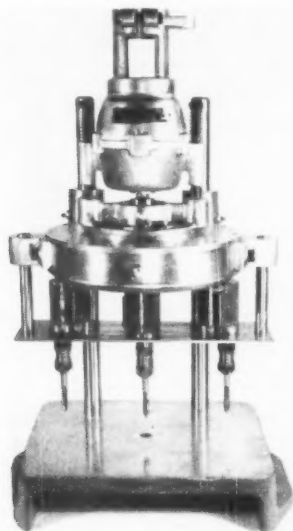
HITCHCOCK PUBLISHING COMPANY

222 E. Willow Ave.

Wheaton, Illinois

Ettco Multiple Drilling or Tapping Head

Flexibility in drilling or tapping parts with hole sizes up to and including 5/16" in steel (on any type drill press) is made possible with the new convertible Ettco-Emrick Adjustable Spindle Multiple Head, made by Ettco Tool Co., Inc., 594 Johnson Ave., Brooklyn 6, N. Y.



Rapid and accurate spindle adjustments can be made from a minimum center distance of 1-1/16" to a maximum center distance of 7 3/8". The spindle can also be located at any point within a 3-5/16" diameter circle.

The template method makes it a simple matter to locate spindles accurately for a given hole combination and to change their location swiftly from one drilling or tapping operation to another.

With the bed plate, components are tied together like a punch and die, therefore always maintaining inbuilt accuracy and lineup. The adjustable spindle multiple head is available with two, three, four or five spindles. Full details of this combination drilling and tapping head are available in Bulletin No. 35.

G. J. Berry, vice president in charge of sales, Electric Products Co., Cleveland, has announced the appointment of E. G. Schroeder to the position of sales manager.

BARGAINS! LONG DRILLS

9" FLUTE 12" HIGH SPEED 12"



Size	Price Each
1/8" x 12"	\$1.71
9/64" x 12"	1.71
5/32" x 12"	1.71
11/64" x 12"	1.71
3/16" x 12"	1.71
13/64" x 12"	1.82
7/32" x 12"	1.82
15/64" x 12"	2.00
1/4" x 12"	2.00
17/64" x 12"	2.12
9/32" x 12"	2.12
19/64" x 12"	2.29
5/16" x 12"	2.29
21/64" x 12"	2.59
11/32" x 12"	2.59
23/64" x 12"	2.88
3/8" x 12"	2.88
25/64" x 12"	3.17
13/32" x 12"	3.17
27/64" x 12"	3.47
7/16" x 12"	3.47
29/64" x 12"	3.76
15/32" x 12"	3.76
31/64" x 12"	3.76
1/2" x 12"	3.76

DIAMONDS

BARGAIN PRICES

KNOWN FOR THEIR PRECISION AND DEPENDABILITY.

SAVE WITH EASTERN

Dress your wheels accurately with long lasting diamonds. Specify holder or nib required. No extra charge.



Carat	Price Complete
1/4	\$2.95
1/2	3.95
3/4	7.00
1	8.95
1 1/2	12.00
2	15.00
3	25.00
4	35.00

Send for Free Catalog 128 pages

EASTERN TOOL SUPPLY CO.
174 Grand St. N. Y., N. Y.

Literature Mentioned in This Month's Advertisements

47. Roto-Clone Dust Control Equipment cuts down on the overhead from grinder dust. Self-contained units, located overhead, away from machines, save valuable floor space. Filtered air returns to work room. Complete details in Bulletin 275 available from **American Air Filter Co.**, 312 Central Ave., Louisville 8, Ky.

48. Molel No. 3 Contour Grinder, a rapid, economical, accurate unit performs hand grinding operations which other types of grinders cannot readily handle. Provided with vertical reciprocating movement of spindle of 3/16". Diamond dresser furnished as standard equipment. Wheel capacity, 1/2"-4" dia., 2"-2 1/2"-3" face. Illustrated circular upon request to **Baker Brothers, Inc.**, Toledo, Ohio.

49. Surface Finish Standards control surface quality to U. S. military standards. With these comparator blocks, a plant can control surface quality and reduce production costs by specifying fine finishes only where needed. Blocks are marked in micro-inches and cover all ordinary machine operations; pocket-size or master sets available. **Edward Blake Co.**, 437 Cherry St., West Newton 65, Massachusetts.

50. Double-Throw Clutch, new, versatile unit; one will run one way, while the other unit runs the other way, or one will run at one speed, the other at a different speed. Recommended for plants which require multiple operations co-incidentally. Precision-made of basic materials, standardized parts. Bulletins available from **The Conway Clutch Co.**, 1105 Marshall Ave., Cincinnati 25, Ohio.

51. Localites, portable lighting units, provide better operator visibility, thereby stepping up work output, cutting down on rejections and cost per work piece. Localites are available in a selection of 30 models with various types of reflectors, arms and bases. Write for "Balanced Lighting" and Localite catalog. **The Fostoria Pressed Steel Corp.**, Fostoria, Ohio.

52. Cemco Precision Shapers in three models, are stated to cut production costs. Plain models in sizes from 16" heavy through 20" heavy-duty; production types in sizes from 16" heavy duty to 36" standard duty; universal models indicated for tool and die work and general machine

shop operation; sizes from 16" heavy duty to 36" standard duty. Bulletin GC-13M contains full information. **General Engineering & Mfg. Co.**, 4417 Oleatha Ave., St. Louis 16, Mo.

53. L-W Swivel Base Milling Machine Vises, heavy duty types, recommended for drill press and shaper work. Sturdy steel jaws; Acme steel screw; four bolt and key slots for attaching to table so that work holding surfaces are at true 90° or parallel to table. Available in three models. Complete catalog gives prices and specifications on all L-W products. **L-W Chuck Co.**, 23 So. St. Clair St., Toledo 4, Ohio.

54. LeBlond Dual Drive gear-belt drive headstock, providing two spindle speed ranges, said to give practically the same productive capacity as two ordinary lathes. Handles work even in 15" swing, 30"-plus center distance. Provides four speeds in carbide range, eight low speeds. Full information included in Dual Drive Bulletin No. 3 available from **The R. K. LeBlond Machine Tool Co.**, Cincinnati 8, Ohio.

55. The Toolmaker Line, including lathe boring tools, collet type speed chucks, adjustable angle plates, as well as several other machine tool attachments, work holding fixtures and surface plate equipment, described in new catalog. See coupon in advertisement, or write **Montgomery & Co., Inc.**, 55 Park Place, New York 7, N. Y.

56. Di-Acro Hydra-Power Bender, new production unit which can bend tubing, angle, channel, extrusions, molding, strip stock, bus bars, all types of solid materials. U-bolts and eye bolts are only two examples of shapes produced by this new unit. The 46-page "Die-Less Duplicating" Catalog gives full information. Sent upon request to **O'Neil-Irwin Mfg. Co.**, 314 Eighth Ave., Lake City, Minn.

57. Pope Precision Spindles, producing finer finishes, increasing production, are supplied in 1/2, 1, 2, 3, 5, 7 1/2 and 10 h.p., and in 3600, 1800 or 1200 r.p.m., to suit the work or the tool. Sealed-in lubrication system permits operation horizontally, vertically or at any angle. Data sheet No. 12 gives full information. **Pope Machinery Corp.**, 261 River St., Haverhill, Mass.

SAVE ON 'PALLEY' WAR SURPLUS MACHINE TOOLS

JUST RECEIVED!! - \$600,000 INVENTORY OF TAPS, DRILLS, CUTTING TOOLS, MILLING CUTTERS, METAL SAWS, ETC. - NEW!!

We've made a terrific buy and we're passing the savings on to YOU!! ALL these tools are NEW - in Perfect Condition - NO SECONDS - NO REJECTS, at PRICES THAT MEAN SAVINGS UP TO 85%. Many are well known makes such as Union, Morse, National, Goddard & Goddard, Cleveland, Pratt & Whitney, Whitman & Barnes, Scully-Jones, Armstrong, Thurston, Brown & Sharpe, and others. Order now while we've got 'em at these BIG DISCOUNTS - They won't last long.



1950 CATALOG
Just all the presses, lathes with machine tools, pumps, hydraulic tools, etc. send for it today!!

SPECIAL BARGAIN

#29 HYDRAULIC CYLINDER

Gives 20,000 lbs. thrust (push/pull) using 1500 PSI line pressure as obtained from our hyd. pumps. Dr. will produce 40,000 lbs. thrust with 3,000 lbs. line pressure. CAN ALSO BE OPERATED ON LOW PRESSURE AIR SYSTEMS. 4" Bore, 1 1/2" dia. piston shaft, 18" stroke, length 30 1/2". Equipped with ball bearing loaded clevis type mounting and swivel type high pressure steel pipe bracket for easy use. Ideal for road farm and shop machinery, presses, etc.
Cost Government \$390.00

NO. 22.50

We carry the World's largest Supply of New Hydraulic Equipment featuring over 20,000 Cylinders in 61 sizes and types. Can also supply all accessories, such as Pumps, Fittings, Valves, Tanks, Hose Fittings. Let us solve your Hydraulic Problems. Write for information.

VICKERS HYDRAULIC TRANSMISSION



Self contained, 2 H.P., constant torque at all speeds with variable volume reversible piston pump (controlled by outside lever) supplying piston hydraulic motor. Automatic pressure, dash pot for smooth control. Power output R.P.M.C. to 1/3 input R.P.M., 1800 continuous. 4000 intermittent. Dash pot can be removed for greater R.P.M. Ideal for Lathes, Duplication Setup on Mills, Conveyors, Small Cars, Drives, Gearing, Etc.

COST GOVERNMENT APPROXIMATELY \$400.00. You'll Chortle when you get it for ONLY 27.50

Universal Joints, Gear Trains, Power Take-offs, Drives for hundreds of adaptations also available.

PNUEMATIC DRILLS

TOOLS RIVET GUNS

15,000 in various makes, sizes, and types consisting of Drills, Rivet Guns, Nut Runners, Screw Drivers, Sequencers & Motors in Clevis, Arm, Integral Front Chicago Pneumatic, etc. Write for complete list & prices today.

SPECIAL
Air Drill or Air Motor with 1/4" Jacobs Chuck

22.50

JUST PURCHASED from WAR ASSETS ADMINISTRATION

Alcort Division OVER 800,000 LBS. of small hardware consisting of Pipe Lock & Elastic Stop Nuts, Needle, Ball & Roller Bearings, Machine Bolts & Screws, Rivets, Pulleys, Hinge stock, Aluminum Angle & Sheet and much more. PRICE TO MOVE FAST!!! Write for list today.

PALLEY SUPPLY COMPANY

6321 SAN FERNANDO RD., Dept. MTB-8
GLENDALE 1, CALIFORNIA

58. Tannewitz High Speed Band Saws cut flat sheets of soft or hardened steels, non-ferrous metals, armor plate, glass, plastics and many other materials. Said to be ideal for cutting formed parts. Free copy of booklet on Friction Sawing available from The Tannewitz Works, Grand Rapids, Mich.

59. Torit Dust Collectors, self-contained units for removing dust-laden air around grinding, cutting and polishing machines. Easily installed and portable, if desired. Operating and maintenance costs stated to be low. Units are built in sizes up

to 5 h.p. For latest Torit catalog, write Torit Manufacturing Co., 303 Walnut St., St. Paul 2, Minn.

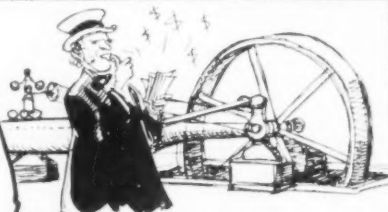
60. Barber-Colman Reamers recommended for cost control and size-finish control. Feature low-cost blade replacement, easy size adjustment, controlled size, straightness, roundness and finish. All extra parts are eliminated in their construction. Complete data contained in File No. 9830 available from Barber-Colman Co., 9830 Loomis St., Rockford, Illinois.

Mechanics Through The Ages

SO IGNORANT OF METAL WERE THE NATIVES OF TAHITI TWO CENTURIES AGO, THAT THEY BELIEVED NAILS WERE SHOOTS OF HARD WOOD THAT COULD BE INDUCED TO GROW! SO SOME NATIVES ACTUALLY PLANTED THE NAILS IN THEIR GARDENS.



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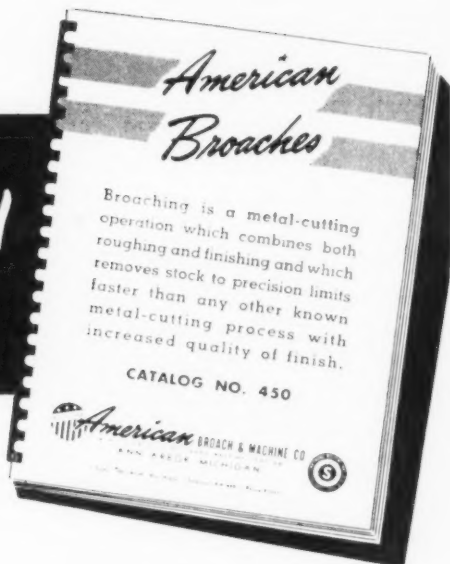


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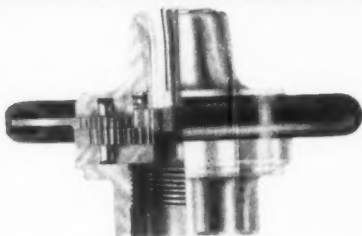
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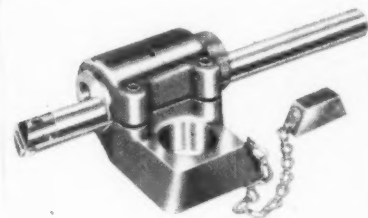
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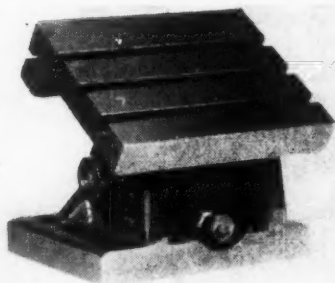
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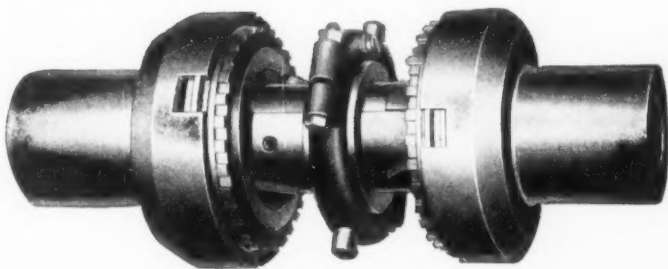


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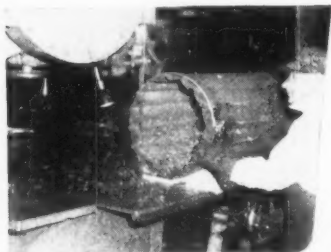
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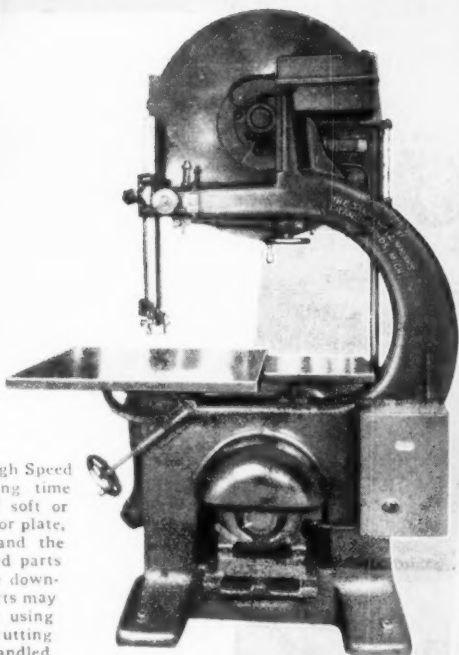


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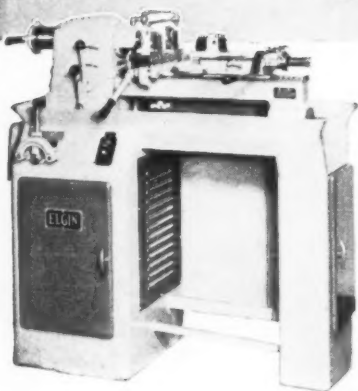
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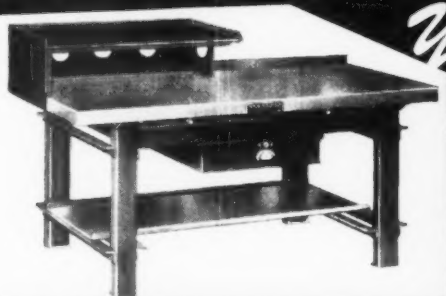
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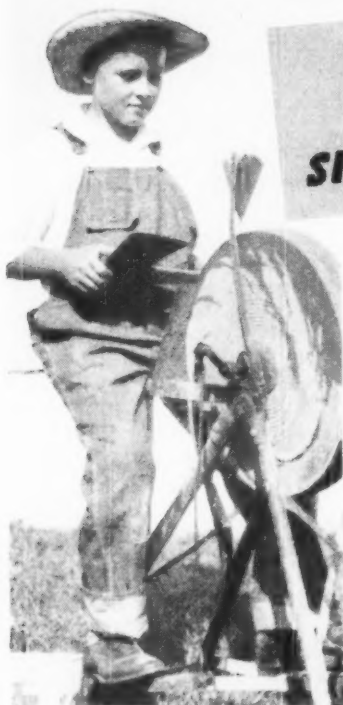
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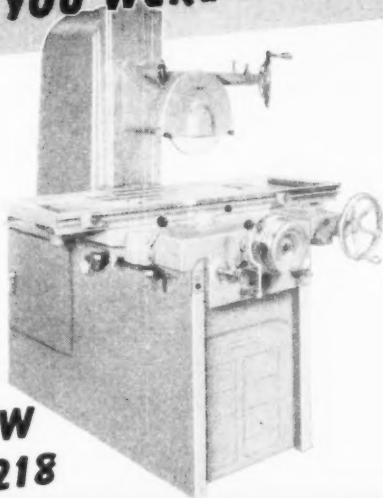
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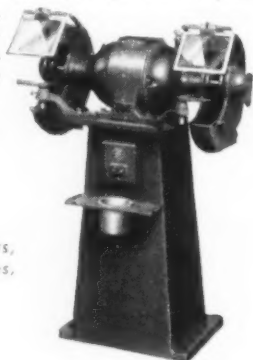
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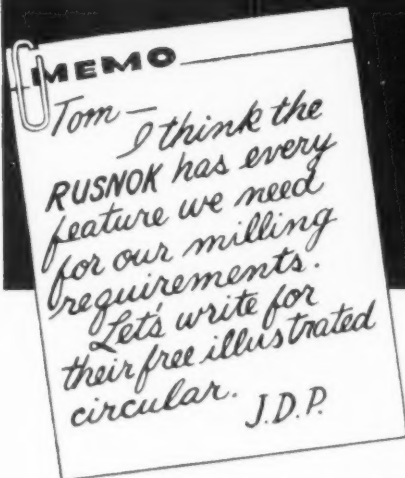
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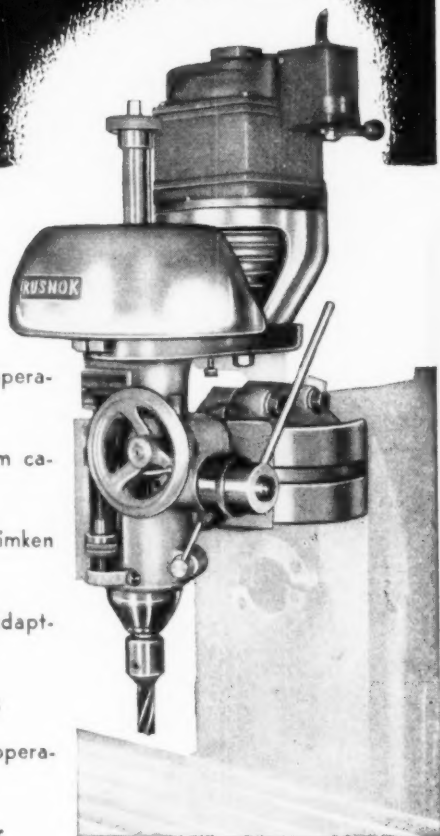
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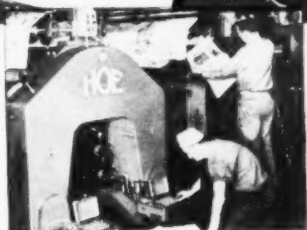




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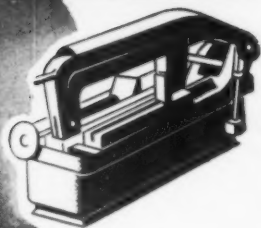


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